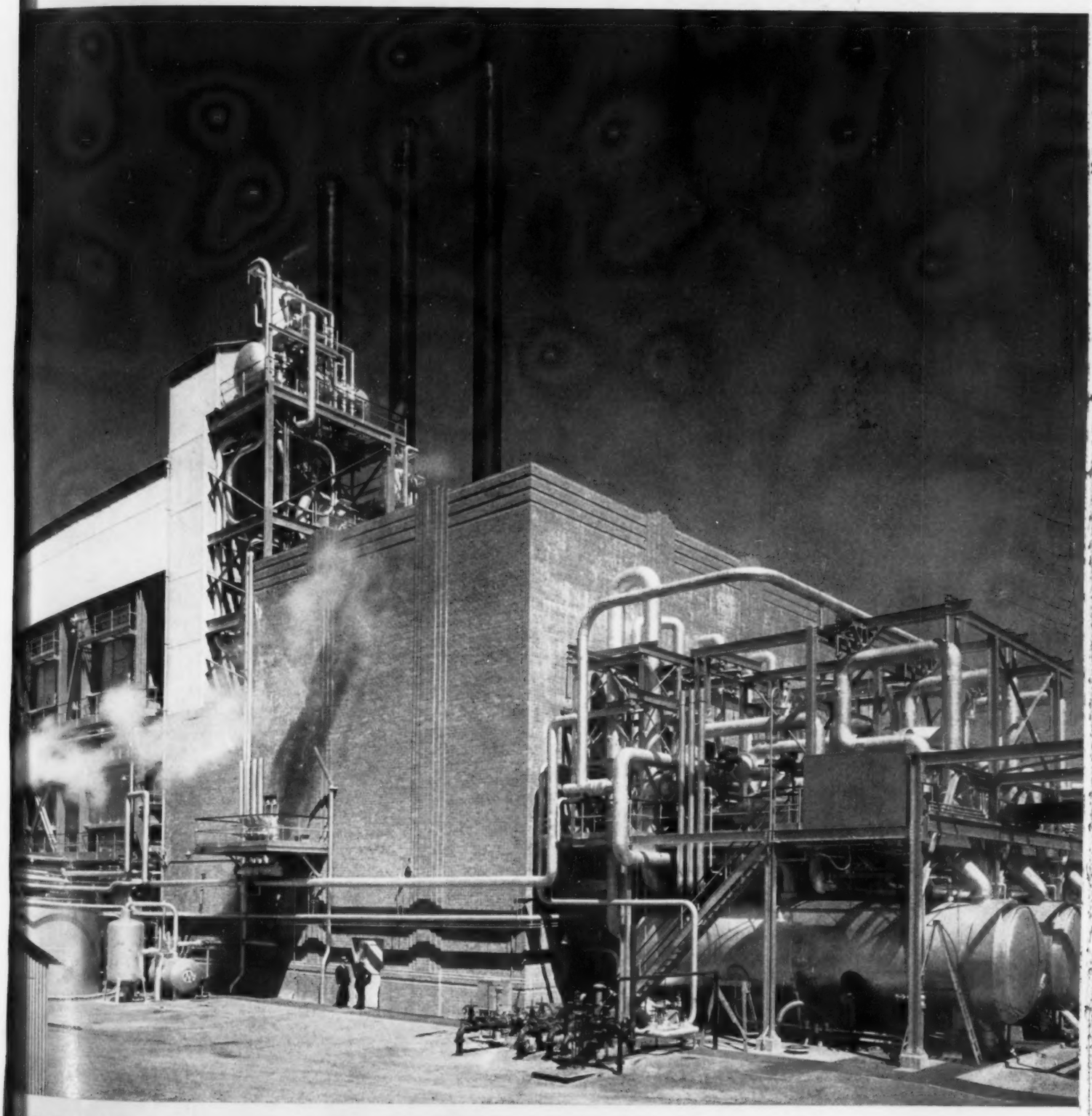
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS



GRAW-HILL CO.
CALIFORNIA

OCTOBER, 1941

25c a Copy

Electrical Times
AUGUST 1941
POWOW
Electric Cooking Featured at Redman's Powow, Downey
New Lamp Dries Nail Polish In Three Minutes
Minxmaster Grinds Flour Electrically for Home-made Whole Wheat Bread
VITAMIN HEALTH BREAD
Adequate Wiring Stretches Your Electrical Penny
Cooking Where You Want It With New Electric Speed Griddle
Special Coffee Maker Combination Offer
New Power Tool for Home Craftsman
Take a Vacation from a Hot Kitchen Any Time... with a Westinghouse
Electric Roaster
Requires Careful Planning
WEATHER FORECAST!
Cool all Summer
Waffles on a Large Scale
Big Trade-In Offer on Sunbeam Shavemasters
FATHER'S DAY JUNE 15

RSVP

TO YOUR DEALER

The invitations are in the mail. Every month, through "Electrical Times", the Edison Company invites its best customers to call on the electrical dealers in Edison territory. This monthly home service magazine has a circulation of 350,000 families. It keeps its readers informed on what's new in electrical equipment. It directs them to you, their nearest electrical dealers, for the service and appliances they want. Make these good prospects YOUR CUSTOMERS by tying up YOUR STORE with Edison advertising. Display, demonstrate and advertise the items featured each month in "Electrical Times".

SOUTHERN CALIFORNIA Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), October, 1941. Vol. 87, No. 4. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
Copyright, 1941, McGraw-Hill Company of California.

IN PLACES LIKE THIS SS CAN SAVE YOU MONEY

NOW... MORE THAN 500,000 Feet in Service

TO construct open-wire or messenger-wire lines through territory like this would be difficult, impossible, or expensive—because of restrictions on tree trimming, or because of the higher cost of installing messenger-wire cable.

Type SS aerial cable made this 5-mile extension possible. The cable is suspended in long spans on 25-foot, class 7 poles—comparatively short, low-cost poles.

5 WAYS TYPE SS SAVES

High tensile and dielectric strength protects against service failure. The outer covering is formed of galvanized-steel wires interlocked with the outer conductors—a strong and flexible support.

Freedom from short circuits even if in contact with earth, trees, or other wires—thus practically eliminating the danger of death or injury by shock.

Better voltage regulation than with open-wire construction, because the ground conductor is of low resistance and low impedance, and is close to the other conductor.

Easily installed without the need for crossarms, pins, or insulators. Can be installed on existing poles with little or no possibility of interference.

Less lightning interruption if exposed wiring elsewhere is eliminated from the system. This is made possible by the ground wire in the outer cover.

In the past few years, more than 500,000 feet of this cable have been put into service. If you would like to know about the sizes available, prices, or other information, consult our local representative. General Electric, Schenectady, N. Y.

3 TYPES AVAILABLE

TWO-CONDUCTOR
For single-phase circuits with one side grounded

FOUR-CONDUCTOR
For three-phase, four-wire circuits

MULTIPLE-CONDUCTOR
For control and communication circuits

GENERAL ELECTRIC

501-2-1200

Here in the WEST

People

P. M. Downing
came up through the ranks himself, so despite being vice-president and general manager of Pacific Gas and Electric Co., he was a most able and informed guide to have show and tell the editor of his company's new steam plants located at three oil refineries (p. 33).

Fred P. Willcox
who has won more pictorial honors than any other San Francisco commercial photographer and who was the designer of the Graphic View camera he is pictured with, and also of the Graflex Variograph enlarger, etc.; whose interests embrace mechanical engineering as well as photography, was ideal to take the pictorial portion of the story.

Ray O. Fischer
besides being display director for Southern California Edison Co. is one of that region's leading artists, whose paintings hang in many homes, public buildings, churches. Twenty years in commercial art he has had to his credit.

Preview

Grand Coulee
will be pictorially and factually covered in a large special section of the November issue of ELECTRICAL WEST, in a manner similar to, yet better than the previous special sections, covering Boulder Dam and later Bonneville. The Boulder Dam section is still being sold to tourists interested in its mechanical and electrical data at Boulder City. The Bonneville pictorial is likewise still being used as a reference. Grand Coulee, now nearly finished and already producing power, is one of the mammoth engineering

achievements of this age of giant projects. Its construction invoked many new techniques and its operation requires some of the largest generators ever constructed. The pictorial presentation of these aspects of the job promises to make this special section one that will be kept for reference and record by the electrical industry for some time to come.

Fate of FHA
As this issue went to press the drastic curtailment of residential building ordered by OPM and FHA, with a limit of $6,000 and a defense prescription necessary before a stick of lumber can be bought, and with wiring limited as to materials and methods, was announced. Next month we hope to tell the details and the outlook. This affects an extensive group in the electrical industry.

Table Appliances
are still a hope for the appliance merchant who may find major units on quota. With the holiday season in the near offing and doubtless an eager public with money to spend, a Sales Guide to aid in quick and effective presentation will be in good time.

Pages

Multiple Service Steam-Electric Stations 33
By P. M. DOWNING as Told to GEORGE C. TENNEY.

Operating Despite Air Raids and Bombs 40
By HARRY TOWERS in Letter to DAVIS M. DeBARD.

AIEE Meet Studies Future 42

Adequate Wiring Reaches the Pursestrings 53

Variety in Infra-Red Applications 58

New Products 6

Bulletins, etc. 14

Electra's Husband 30

Engineering 40

Sales 45

Sales Guide 48

Lighting and Wiring 53

Rural 65

Editorials 66

Associations 68

News 73

Cover picture is of the Avon steam plant of Pacific Gas and Electric Co. described in detail on pages 33-39.

NO. 7

ALUMINUM, DEFENSE, AND YOU

ALCOA

THE TIMETABLE OF ALUMINUM FOR DEFENSE

up to September 10, 1941

1938 Sept. *Munich.*
Oct. *Czechoslovakia invaded.*
Nov. Alcoa inaugurates $26,000,000 expansion program.
Dec. Alcoa produced 287 million pounds in 1938; had more than a year's supply on hand.

1938

1939 Jan. New extrusion and tube mill begins operation at Lafayette, Ind.
Feb. Start building an excess stock pile of airplane sheet.
Mar. *Bohemia and Moravia occupied.*
Apr. *Albania invaded; Congress authorizes Army to acquire 6,000 planes by July, '41, and Navy 3,000 by '44. Aluminum for all these would take about two months 1941 production.*
Sept. *Poland invaded; U. S. Neutrality proclaimed; limited National emergency proclaimed.*
Alcoa authorizes new metal-producing capacity at Alcoa, Tenn.
Nov. *Finland invaded; Cash-and-carry act signed.*
Alcoa completes $26,000,000 expansion program, begins plans for a larger one.
Dec. *U. S. protests blockade of German exports.*
New metal-producing plant authorized at Vancouver, Wash.
1939 production 327 million pounds; 215 million on hand.

1939

1940 Jan. *First request for defense appropriation in Budget Message.*
Alcoa announces $30,000,000 more plant expansion.
Mar. Alcoa reduces price of aluminum from 20c to 19c, starts construction of Vancouver, Wash., plant.
Apr. *Denmark and Norway invaded.*
May *Low countries invaded; National Defense Advisory Commission named.*
New metal-producing unit begins operation at Alcoa, Tenn.
June *Dunkerque; France capitulates.*
Additional metal-producing unit authorized at Alcoa, Tenn.
July *Congress lifts previous limits on numbers of planes.*
Aug. *Air offensive against England begins; 50 destroyers exchanged for island air bases.*
Alcoa reduces price of aluminum ingot from 19c to 18c; capacity for making alumina increased.
Sept. *Egypt invaded; Selective Service Bill passed.*
First metal manufactured at Vancouver, Wash., plant and new units for additional capacity authorized.

1940

Oct. *Rumania invaded.*
Alcoa authorizes another $150,000,000 for expansion.
Nov. *26 bombers on contract turned over to Britain.*
Alcoa reduces ingot price from 18c to 17c; additional capacity authorized at Badin.
Dec. Alcoa 1940 production 413 million pounds; 154 million on hand.
1941 Jan. *OPM established; NDAC says aluminum supply adequate to meet October, 1940, estimates of requirements.*
Alcoa authorizes additional capacity at Alcoa, Tenn.
Feb. *Aluminum put on priorities.*
Mar. *Lend-lease bill signed.*
Alcoa produces 44,000,000 pounds of metal this month.
Apr. *Yugoslavia invaded; U. S. occupies Greenland.*
May 150 million-pound-annual-capacity plant at Vancouver, Wash., completed and operating at capacity.

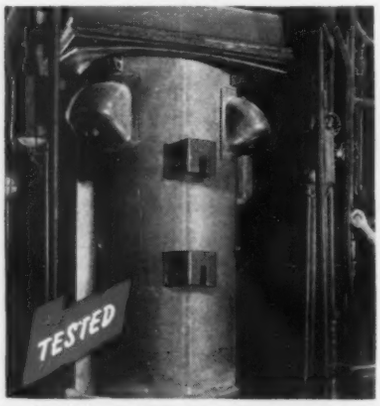
1941

June *Crete lost; Russia invaded.*
July *New Government aluminum plants authorized; U. S. occupies Iceland; Japan moves into Indo-China.*
Alcoa produces 53,000,000 pounds this month; Badin unit authorized November, 1940 starts operation.
Aug. *U. S. Government announces Aluminum Company of America will build and operate 3 Government-owned aluminum smelting plants and one for making alumina.*
Alcoa announces ingot price reduction to 15c, effective October 1, 1941.
Alcoa and T. V. A. conclude agreement to unify two great hydro-electric power systems in the Tennessee Valley, which will add at least 200,000,000 pounds to America's annual aluminum producing capacity.
Alcoa produces 54,000,000 pounds of aluminum this month.
Sept. Sites selected for one of the Government-owned aluminum plants and for the alumina plant; railroad, water, and sewage facilities provided; construction contracts being executed.
Excess stock pile of aluminum airplane sheet started in February, 1939, being maintained at 5,000,000 pounds.

ALUMINUM COMPANY OF AMERICA

"Give me the Transformer with the SIX STAR FEATURES!"

★1 Simplified Supports for Direct Pole Mounting Cut Installation Time. Standard Support Spacing and Bushing Location Mean Complete Interchangeability of All Sizes and Makes.



★2 New, Durable, Copper-Bearing Steel Tanks. Tested Under Pressures Far Greater than Normal . . . Prevent Oil Leakage, Assure Long Life and Complete Safety.

★3 New Spra-bonderizing Process . . . Plus Triple Coat Automobile Finish Give Tanks Positive Four-way Protection Against Rust and Corrosion.

★4 Extra-heavy Porcelain Coordinated Bushings with Liberal Creepage Offer Maximum Reliability Under Fog, Dust, Chemical or Other Adverse Conditions.

AC ALLIS-CHALMERS DISTRIBUTION

More and more distribution engineers all over the country are specifying the transformer with the six star features . . . the new Allis-Chalmers Distribution Transformer that leads the field with six great engineering advancements.

That's because they want a transformer that's designed to give them the best all-around service — *easier installation . . . greater dependability . . . money-saving operation.*

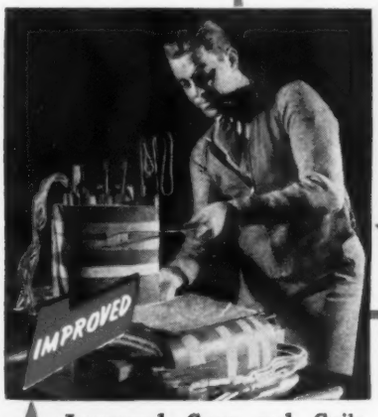
And you'll find that's what they're getting when *you* buy the new Allis-Chalmers Distribution Transformer. Your specifying and buying are simplified — standardized location of bushings and supports makes all sizes and makes completely interchangeable . . . there are fewer parts and fewer complete units to handle in stock.

Be sure you check the rest of the six star features — the tested-under-pressure tank . . . spra-bonderizing plus triple-coat automobile finish . . . extra heavy bushings . . . double conductor insulation . . . improved core and coils. *No other distribution transformer on the market can give you all these engineering advancements!*

Find out how *complete* engineering gives you *complete* all-around performance! Write for Bulletin B6159. Allis-Chalmers, Milwaukee, Wisconsin.

A-1436

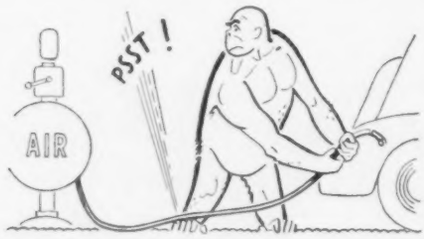
5 Double Conductor Insulation . . . Flexible Enameled Wire . . . Plus Added Protection of Well-Lapped Cable Paper Give Double Safety Against Winding Failures.



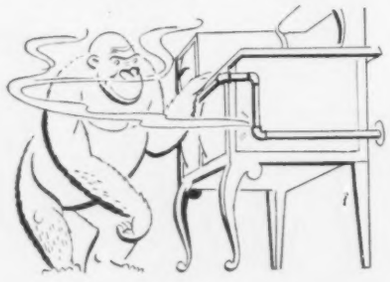
6 Improved Core and Coils, Liberally Designed with No Manufacturing Short Cuts . . . Mean Extra Years of Service-free Performance.

TRANSFORMERS *Cut Operating Costs*

You can SEE a Water leak.

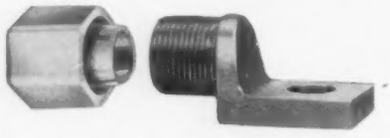


You can HEAR an Air leak.



You can SMELL a Gas leak.

But . . . with Electricity you can't See, Hear or Smell the leak.



And that's why you should have a mechanically as well as electrically perfect connection.

A National Electric Gorilla Grip Connector will give you just that. Investigate.

National Electric
PRODUCTS CORPORATION
1300 Fulton Bldg. Pittsburgh, Pa.

PRODUCTS
that are news

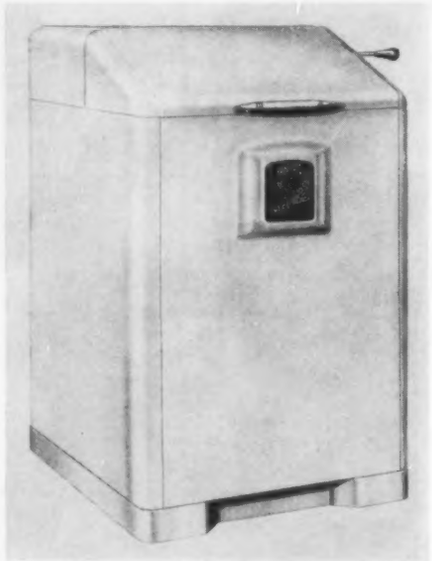
Midget Flash (1000)

A midget photoflash lamp, known as focal plane No. 6, has been produced by the Westinghouse Lamp Division. Flash duration is about 1/20 of a second, and average peak output is 500,000 lumens. With synchropress timing of 0.020 second to peak, it may be used in all synchronizing equipment designed for the earlier No. 5 photoflash lamp.

For use with polyphase wound-rotor motors on fan, pump and similar drives, a new motor-operated secondary controller is announced by Westinghouse. This SC controller provides either 13 or 20 balance points of control by varying the external resistance in the motor secondary windings. Enclosed in a self-supporting steel cabinet, the unit has cam-actuated contactors arranged for sequential operation in pairs from a common motor-driven cam shaft. Individual cams give "quick-make" and "quick-break" contact action. Motor may be supplied for 115 or 230 volts d.c. and 110, 220 or 440 volts, a.c.

Improved Washer (1001)

A new washer that eliminates set tubs and all tub rinsing and washes, triple rinses in running water and damp dries a 9-lb. load of wash in 10 min., is the description offered of the ABC-O-Matic by the manufacturer,



Altorfer Bros. Co. This washer has a plastic agitators, spray rinses and dip rinses in clean water, and damp dries safely by pressure. The washer can operate as a portable kitchen unit or as a permanent home laundry installation.

Portable Test Set (1002)

Designed for field tests of installed bushings, and insulators, a new portable test set has been developed by Leeds & Northrup Co. According to the company, it is also useful for measuring dielectric characteristics of small cable lengths, oils, compounds and other dielectrics. In 220-kv. switchyards, this test set is free from the effects of electromagnetic and electrostatic stray fields emanating from power circuits. Immunity from stray fields results from the use of a detector which responds to a frequency of 70 cycles but not to the standard 60. The odd 70-cycle frequency is supplied by a motor-generator set. Scales read directly in power factor and capacitance, and at the normal test voltage of 10,000 volts no correction factors need be applied to the reading. Two high-voltage transformers, one a step-up and the other step-down, provide potential for tests at a normal test voltage of 10,000 volts. This voltage can be reduced as low as 2500 volts by regulating unit. Step-up transformer and motor of motor generator set operate on 115 volts, 60 cycles.

Heating Pads (1003)

A new line of heating pads for fall, featuring new colors and new cover materials, is announced by General Electric Co. heating device section. The new models all have two non-radio-interfering thermostats calibrated to keep the pad at positive heating level selected on the 3-temperature switch.

Door Chimes (1004)

NuTone Chimes, Inc., is offering a new type of door chime with a thermometer and humidity gage. The chime has a 2-door arrangement, two notes for the front door and one for the back.

Mixmaster Feature (1005)

Chicago Flexible Shaft Co. has a new "Sunbeam" mixmaster featuring an automatic beater ejector. According to the company, with this improvement the user simply tilts down the handle and the beaters are automatically ejected. Other features of the new mixmasters are the same as those of a previous model.

Set Screw Lug (1006)

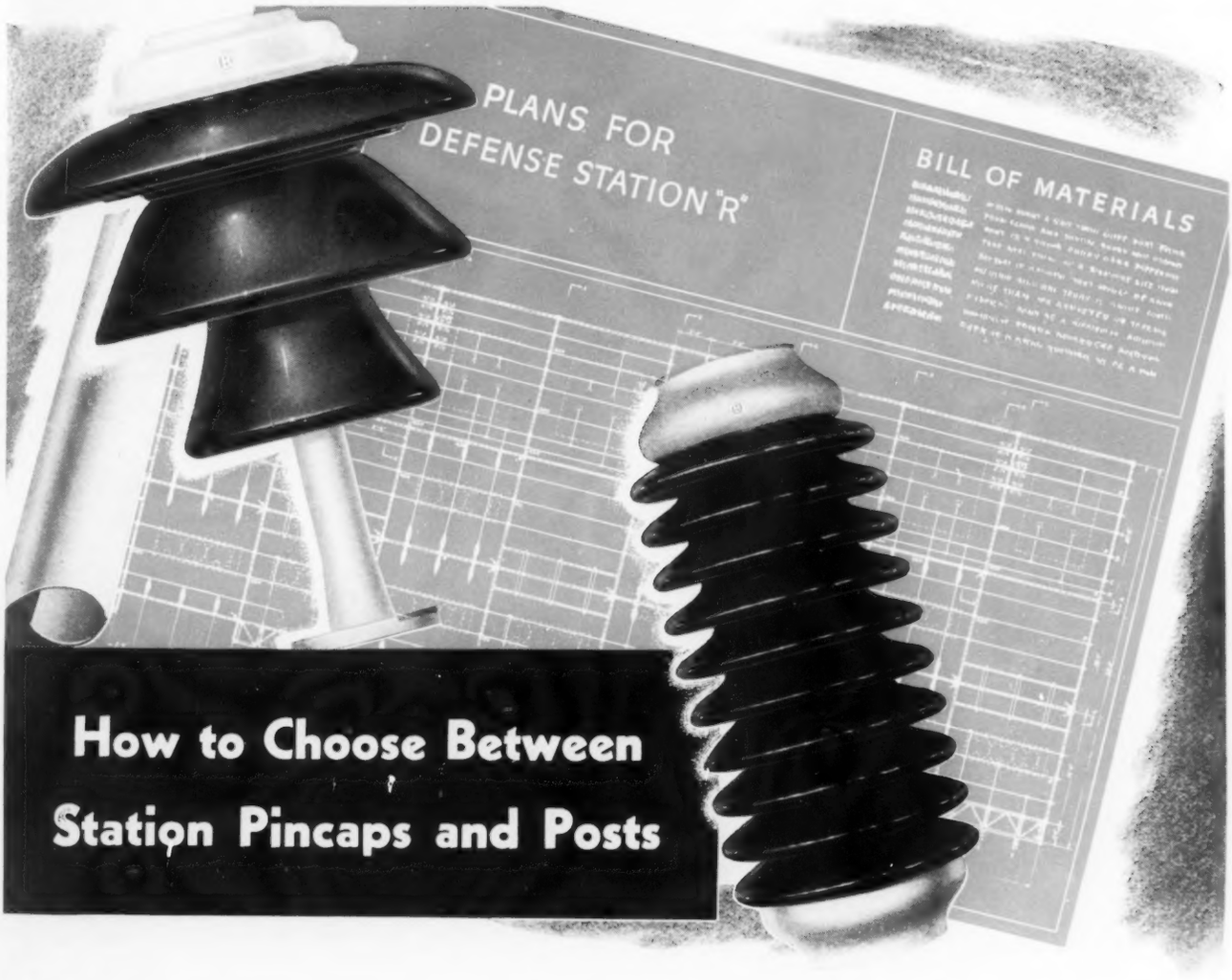
A solderless lug of the set screw type made of seamless, electrolytic copper with a heavy brass check-proof shell that reduces heating, is a development of the Ideal Commutator Dresser Co. Full current carrying capacity is evenly distributed from wire to lug.

Utility Box (1007)

A new utility box with side bracket for surface work in industrial locations is a new development of General Electric Co.'s appliance and merchandise department. A close, rigid bracket on these boxes permits installation of the boxes without protrusion beyond the face of the joist. The boxes can be nailed to the side and front of studs, providing easy, rigid installation.

Strain Clamp (1008)

. Ease of installation characterizes the new strain clamp recently placed on the market by the Porcelain Insulator Corporation. The Pinco strain clamp is a straight line clamp primarily intended for use at main line or substation dead ends. A "Kum-along" grip is on the side of the clamp for easier installation. With the "Kum-along" grip it is possible to tighten wire with the clamp in place. Worry about getting the conductor in the clamp is eliminated. Designed by Pinco and made of electric-furnace annealed malleable iron with a double dip galvanized surface, the new clamp is made in a complete range of sizes to handle conductors from .291 to 1.15 inches in diameter.



How to Choose Between Station Pincaps and Posts

Selecting the proper type of switch and bus insulator—conventional pincap or station post—involves consideration of the various specifications for the station being planned. Physical requirements, for example, may call for certain diameters, heights and clearances, for a specific method of mounting and securing attachments, for stacking of units, or for matching existing installations. Electrically, the insulators must have adequate dry, wet and impulse flashover and withstand characteristics, and they may have to provide high surface resistance. In addition, various mechanical requirements may be desired, such as extreme rigidity, maximum resilience, high bending strength, and resistance to mechanical breakage. Both pincaps and posts are free of radio interference, have adequate electrical values, and stand severe weather, so it is only necessary to weigh the other factors. After considering these factors the selection problem resolves itself into one of determining which type of insulator meets the *most important* requirements satisfactorily. When you have decided on the proper type of switch and bus insulator for a station, your next concern is getting the best units available. To be sure of *top quality*—to get station pincaps *or* posts which will give the most in performance and life—specify O-B!

Buy the Best ... Buy O-B

Ohio Brass

MANSFIELD, OHIO, U. S. A. 2224-H

Canadian Ohio Brass Company, Ltd., Niagara Falls, Ont.

PLUGMOLD *Specified*

for 550 rooms in this hotel!!

Typical bedroom in Henry Grady Hotel. Note how inconspicuous PLUGMOLD appears when painted to match walls.

PLUGMOLD is quickly installed. Sufficient slack in wires permits proper and easy location of receptacles.

That's Nice Business

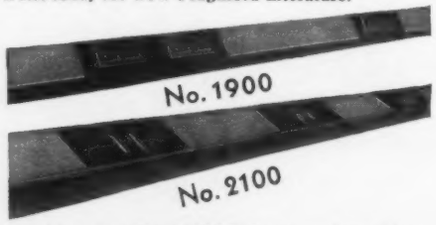
Mr. Contractor . . .

Atlanta's Henry Grady Hotel has specified Plugmold for convenience wiring in each of 550 guest rooms. That's profitable business, and there are opportunities like that right in your own territory, not only in hotels but in offices, stores, factories and homes.

In fact, wherever electricity is used for lights, for appliances, for small hand tools or office machines, there is need for the time-saving convenience and greater safety of PLUGMOLD . . . the simple, flexible Wiremold Plug-in-Anywhere Wiring System that permits installation of all the outlets required in exactly the right places. Plugmold becomes a permanent part of the interior trim.

Be prepared to get your share of this business Write today for new Plugmold Literature.

At the Henry Grady Hotel PLUGMOLD was easily connected to existing boxes and installed between baseboard and molding.



No. 1900 PLUGMOLD for general use: No. 2100 PLUGMOLD for switch controlled circuits and for use in offices, factories, stores etc.

THE WIREMOLD COMPANY
HARTFORD, CONN.

Electronic Welder (1009)

An electronic welding contactor, for use with timing facilities, as used in spot welders, has been announced by Westinghouse Electric & Mfg. Co. Known as the SW 150 Weld-O-Trol, this unit, for spot welding applications, is rated equivalent to a size 2-W mechanical contactor at 220 or 440 volts, 50/60 cycles. Welding current is handled at extremely high rate of interruption by two water-cooled ignitron tubes. The tubes are held by water-cooled clamps made of copper tubing cast in heat-conducting alloy. Provisions are made for removal of tubes without disturbing the water connections and a thermostat mounted on the cooling clamps protects the tubes against high temperatures caused by failure in the water supply. According to the company, the unit is adapted readily for use with heat control and either synchronous or non-synchronous weld timers, including sequencing equipment.

Low-volt Transformer (1010)

Ideal Commutator Dresser Co., electrical equipment manufacturers, have available a low-volt transformer for workmen using extension lights in damp, all-metal or otherwise hazardous locations. The unit reduces line voltage to 6 volts and is compact, portable and fully insulated.

Dry Type Indoor (1001)

Designed for 3-wire metering applications demanding high accuracy, new dry type indoor current transformers are being developed by Westinghouse Electric & Mfg. Co. These units are made in 18 ratings covering a range from 5 to 500 primary amp. on lines up to 1200 volts. Designated type TW, they have practically flat ratio and phase angle curves from 15 to 200 per cent current, resulting in high metering accuracy over a wide range of loads. It is claimed that they are unaffected by unbalanced loads, performance being the same under zero or maximum unbalance in the 3-wire circuit. Windings and insulation withstand 30-kv. impulse and 10-kv. 60-cycle tests, and high surge strength is obtained by high quality insulation coils.

Permaflector (1012)

Pittsburgh Reflector Co. has introduced a silver mirrored glass reflector called the Permaflector, for use with fluorescent lamps. According to the manufacturer, this standard reflector gives intense concentration of fluorescent light, with maximum candlepower occurring at 0 deg., thereby producing on the work plane an elongated strip of high intensity illumination. Dimensions of the reflector are: depth, 3 1/16 in; width, 8 in. and length, 11 in.

Bus Support (1013)

A heavy-duty 23-kv. class C-7 bus support for supporting two groups of 2¼ x 4 in. bars with wide center spaces to secure better current distribution has been developed by Delta Star Electric Co. Conductor fitting is equipped with non-ferrous rollers on each side of the bar groups, permitting movement of conductors without unduly stressing porcelain. Spring bronze spacers between bars prevent chattering and pipe spacers between outside clamps and center castings limit pressures on spring spacers to a predetermined value. Cantilever stresses are transmitted directly to porcelain through center casting. These units are made for ratings up to 34.5 kv.

VOLTAGE & VICTORY

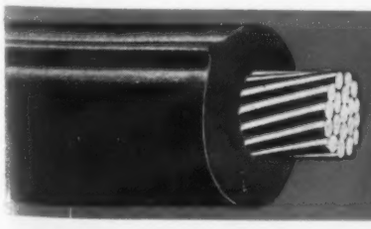
The two are inseparably linked by the needs of a mechanized world . . . needs that may demand a single cable insulated for 220,000 volts and with capacity enough to supply the electric power for an average city or major industrial center.

Cables that will withstand oil . . . or sunlight . . . or excessive heat . . . or chemical action.

Cables for the navy . . . for the army . . . submarine power cables . . . electric lines for boiler rooms . . . railway signal wires whose reliability must be unquestioned . . . flexible "cords" two or three inches in diameter, to string along the ground to the monster shovels that scoop up tons of coal at a bite . . . supple welding cables . . . all these and dozens more, large and small, are found in the list of cables we supply to industry, to transportation and to central stations.

For this work, our organization, through its Engineering Service, combines an experience of over 60 years, unique manufacturing methods, a research organization completely staffed and equipped for the work and production facilities which enable us to manufacture every type of insulated wire and cable.

Detailed information as to proper design and specifications of cables for particular applications will be gladly furnished on request by The Okonite Company, Passaic, New Jersey. Offices in principal cities.



OKONITE

OKONITE

INSULATED WIRES AND CABLES

HE KNOWS *FROM* EXPERIENCE

"Since 1857"

FROM the oldest "old timer" on the sticks to the youngster just starting, "Klein" means highest quality in electrical tools and equipment.

Experience is the best teacher, and experience with Klein equipment dates back to the day when the fathers and grandfathers of today's old timers were entering the field just opened by that new marvel, electricity.

Any tools that have served industry so well—for so long—must have behind them a valuable backlog of continued leadership.

That Klein pliers today still lead is adequate proof of the care, the skill, the quality that goes into every pair.

Your copy of the Klein Pocket Tool Guide will be sent on request.

ASK YOUR SUPPLIER

Foreign Distributor:
International Standard Electric Corp., New York

Mathias KLEIN & Sons
Established 1857 Chicago, Ill. U.S.A.
3200 Belmont Avenue, Chicago, Illinois

Ground Fittings (1014)

A new line of pressure connector ground fittings for use with conduit wiring, armored wire and unarmored wires was announced recently by General Electric's appliance and merchandise department. These ground fittings are in accordance with the requirements of the 1940 National Electrical Code, according to the company. Teeth on the connector hubs and on the water pipe clamps of these fittings permit ground conductors to meet water pipes at any angle. The clamps have reinforcing ribs that give extra strength. The pressure grip makes a firm and secure contact. The pressure connector ground fittings are made of malleable iron and are heavily galvanized to resist corrosion.

Inside-Silvered Lamp (1015)

North American Electric Lamp Co. has developed an inside-silvered carbon filament lamp designed or infra-red ray processes. The polished silver in the base end of the lamp acts as a reflector to project the infra-red rays toward the surface being worked on. These lamps are of the carbon filament type and the manufacturer claims that the red-ray emanation from the carbon filament falls in the more desirable band on the Angstrom scale for maximum drying efficiency.

Starter Device (1016)

An improved starter device, for G-E 40-watt Mazda F lamps, which includes a "stopper" element that shuts off the starter element of the lamp has reached the end of its normal life, has been announced by General Electric Co. The device is included in the same small cylindrical container that is standard for conventional starters and will be interchangeable with present units.

Level Control (1017)

Photoswitch, Inc., has a level control series P16 providing on and off valve or pump control of liquids. Photoswitch probes or electrodes are attached to the tank at levels representing the low point where pumping starts and the high level where pumping stops. These probes are wired to Photoswitch level control and when the liquid level rises to the upper probe, the fluid itself acts as a conductor of the small amount of current required for the operation of the control which stops the pump.

Cylinder Cleaner (1018)

Landers, Frary & Clark, manufacturers of Universal cleaners, are featuring a new cylinder-type cleaner which is equipped with triple turbine-type fans for suction; an ac.-dc. electric motor and an all-metal swivel devoid of gaskets. Increased suction power is claimed for the improved design nozzle. Air passing through the cleaner is filtered twice, and the twill dust bag has a special finish for maximum filtering efficiency, according to the manufacturer.

Adjustable Bar Hanger (1019)

Appleton Electric Company has a adjustable bar hanger which, according to the company, replaces the regular straight, shallow and deep offset bar hanger. The unit is made in two parts and held together by a set-screw stud, as well as the outlet box, which is fastened to the hanger. Use of this bar hanger is to eliminate any bulge on the surface in connection with surfacing material.

Here's how Easy it is to
BANK WITH US BY MAIL

1 **Write for simple instructions on opening a mail account.**

2 **Mail us deposits in special envelopes which we provide.**

3 **We send by return mail a receipt for every deposit and forms for the next mailing.**

4 **Statements are sent monthly, and additional check books as requested.**

Why don't you avail yourself of this convenient banking service today?

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

Member Federal Deposit Insurance Corporation

THERE ARE SQUARE D MULTI-BREAKERS FOR EVERY SIZE AND TYPE OF HOME

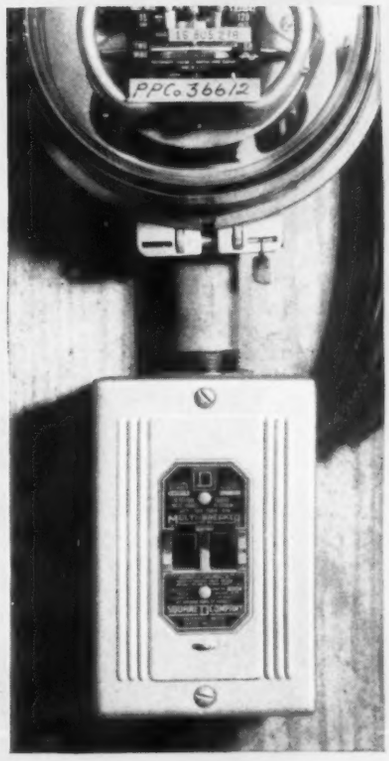
See how little Multi-breakers cost in these 53 Modern Homes in the $4000 class

● The latest addition to this housing project was a group of fifty-three homes, built by the Moline Housing Corporation.

Both the Corporation and its architect recognized the advantages of Square D Multi-breaker convenience and protection. They realized, too, that the Multi-breaker's *visible value* helps sell homes. The only question was cost. Could Multi-breakers be used at a price comparable to that of switch and fuses?

Figures were given by the electrical contractor and checked by the architect. The homes have two-circuit wiring with approximately 25 outlets. The wiring cost was $62.50 plus $18.00 for fixtures, a total of $80.50. *In that cost was only $2.80, list price, for the Square D Multi-breaker.*

Practically all these homes were sold before completion. The owners have the most modern circuit protection—will never have to buy or replace a fuse. The electrical contractor had a nice, profitable wiring job of which he can be proud.



CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

KOLLSMAN INSTRUMENT DIVISION, ELMHURST, NEW YORK

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

RUBBER COVERED POWER CABLES • BUILDING WIRE • VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE • CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

CRESCENT

IMPERIAL PORTABLE

and

IMPERIAL WELDING CABLES

are doing their part in speeding up the defense effort. Covered with a TOUGH tire-tread jacket of highest quality mold-cured rubber, these cables are being increasingly used on welding jobs and for other work where tough, flexible cables are required.

CRESCENT INSULATED WIRE & CABLE CO.

CRESCENT
WIRE and CABLE
Factory: TRENTON, N. J.—*Stocks in Principal Cities*

LOS ANGELES
Tri-State Supply Corp.
544 S. San Pedro St.

SAN FRANCISCO
Hodges & Glomb
1264 Folsom St.

KANSAS CITY
W. F. Howe & Co.,
2627 McGee St.

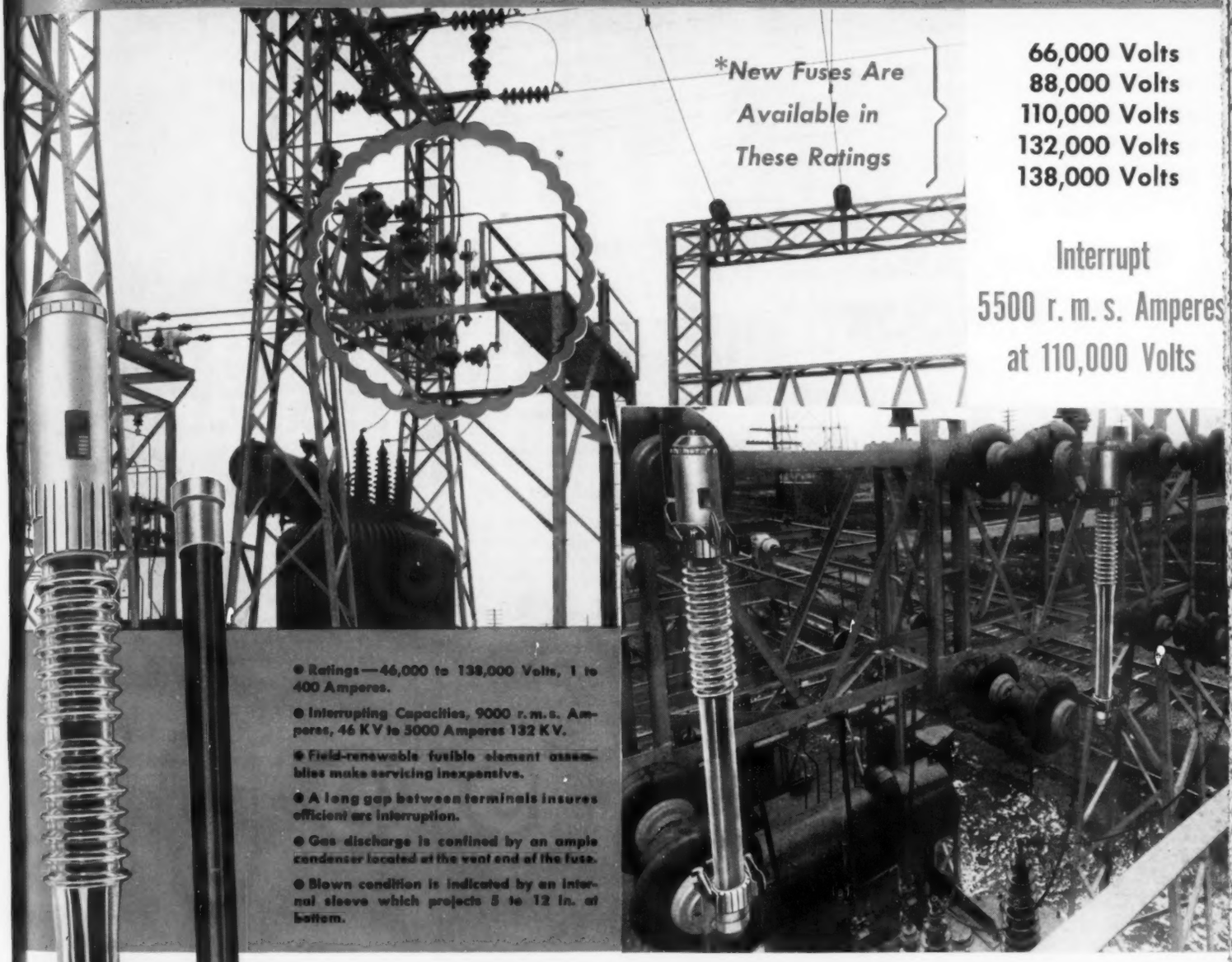
CRESCENT ENDURITE SUPER - AGING INSULATION

Westinghouse Appliances (1020)

A new type of automatic toaster which not only provides the desired degree of brownness, but also the desired degree of crispness, features the new line of traffic appliances announced by Westinghouse Electric and Manufacturing Co. The new toaster is equipped with an automatic crisper which makes possible soft, medium, or crisp toast as well as three stages of brownness—light, medium, or dark. Another feature of the toaster is that it is equipped with a plastic cover which keeps dust out of the toast wells while it is not in use and which, when inverted, can be used as a toast server. Another featured model in the appliance line is the new "Three-in-One" heating pad. This three-temperature pad is so constructed that it may be used in any one of three shapes by means of a zipper attachment. When zipped together at the ends, it is a long, narrow pad ideal for use around leg or arm. Zipped together in the middle it is a large, square pad for conventional use. Partly opened it has two

wings which makes it desirable for use across the back of the neck or shoulders. This model automatically maintains any one of three temperatures — 120 degrees at low, 150 degrees at medium, and 180 degrees at high. Also introduced was a complete new line of coffee makers in a choice of styles and capacities. Most models have two-heat stoves so proper drinking tempera-

S & C EXTENDS HIGHER INTERRUPTING CAPACITY FUSES INTO TRANSMISSION VOLTAGE* FIELD



*New Fuses Are Available in These Ratings

66,000 Volts
88,000 Volts
110,000 Volts
132,000 Volts
138,000 Volts

Interrupt
5500 r. m. s. Amperes
at 110,000 Volts

- Ratings—46,000 to 138,000 Volts, 1 to 400 Amperes.
- Interrupting Capacities, 9000 r.m.s. Amperes, 46 KV to 5000 Amperes 132 KV.
- Field-renewable fusible element assemblies make servicing inexpensive.
- A long gap between terminals insures efficient arc interruption.
- Gas discharge is confined by an ample condenser located at the vent end of the fuse.
- Blown condition is indicated by an internal sleeve which projects 5 to 12 in. at bottom.

● Nothing like the S & C type SMG Power Fuse has heretofore been available. This fuse is designed for high voltage service from 46 KV to 138 KV, with greatly increased interrupting capacity—9000 amperes for the 46 KV fuse to 5000 amperes for the 132 KV size.

The type SMG Fuse combines the important features of S & C type COR Fuse for high-voltage service, and the S & C type SM boric acid fuse for high interrupting capacity service.

SM Fuses thus provide system protection the equivalent to that of much larger and costlier circuit interrupting equipment.

SAVE INSTALLATION and SERVICING COSTS

You can install S & C type SMG Fuses on the high-voltage sides of stepdown substations—at sectionalizing points on transmission lines—or at points on high-voltage systems where possible short circuit energy is high, and where load-switching facilities are not needed.

Installation is simple and less costly—servicing can be done in the field. Refer to new S & C Bulletin 200-F or write for a copy.

SCHWEITZER & CONRAD, INC.
4435 Ravenswood Avenue, Chicago, Illinois

S & C type SMG Power Fuse shown at left with SM1 Fuse Unit to the right of it. When blown the fuse unit may be replaced in the field, without special tools.

TYPE SMG POWER FUSE

NEVER BEFORE SO MUCH PRACTICAL HELP FOR ELECTRICAL ENGINEERS IN A SINGLE VOLUME...

Just Out...

The New Improved 7th Edition

STANDARD HANDBOOK for ELECTRICAL ENGINEERS

The great, standard, handy-reference compilation of fundamental theory, standards, data, and practice, from all fields of electrical engineering — now thoroughly revised, brought completely up to date, new topics added.

Editor-in-Chief

ARCHER E. KNOWLTON

Associate Editor (for Engineering) of Electrical World

New Format. Seventh edition of the Standard Handbook now in standard textbook size—permitting larger type and illustrations, more material in convenient form, fuller indexing—a more useful book in all ways.

Contributors now number 102—every section given specialized, expert treatment, to assure you most authoritative and dependable information.

Thousands of Useful Facts in These

26 BIG SECTIONS

- Units and Conversion Factors
- Electric and Magnetic Circuits
- Measurements
- Properties of Materials
- Circuit Elements
- Transformers, Regulators and Reactors
- A-C Generators and Motors
- D-C Generators and Motors
- Rectifiers and Converters
- Prime Movers
- Power Plant Economics
- Power System Electrical Equipment
- Power Transmission
- Power Distribution
- Wiring Design — Commercial and Industrial Buildings
- Illumination
- Industrial Power Applications
- Electric Heating and Welding
- Electricity in Transportation
- Electrochemistry and Electrometallurgy
- Batteries
- Wire Telephony and Telegraphy
- Electronics and Electron Tubes
- Radio and Carrier Communication
- Codes and Standard Practices
- Electrophysics

Price—$8.00

Send this coupon today for

10 DAYS' FREE EXAMINATION

McGRAW-HILL BOOK CO., Inc.,
330 W. 42nd St., New York

Send me a new 7th edition Standard Handbook for Electrical Engineers for 10 days' examination on approval. Within 10 days of receipt, I will send you $8.00, plus few cents postage, or return book postpaid. (We pay postage on orders accompanied by remittance.)

Name_____

Address_____

City and State_____

Position_____

Company_____

O. 10-41

(Books sent on approval in U. S. and Canada only.)

ture can be maintained. Introduced is a new percolator in a spherical design. Of solid copper body this 8-cup model has a cold-water type pump for fast perking and a recessed well design which makes as few as two cups of coffee when desired. The complete appliance line also includes the two Westinghouse roaster ovens introduced several months ago, the Westinghouse Adjusto-matic streamline iron, and two other iron models, two sandwich grills, and three waffle bakers, two of the round type and one a twin baker with individual heat indicators. A hot plate and room heater complete the line.

BULLETINS

data books, etc.

Keep Posted for 1c

Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do to help yourself toward better performance and greater rewards.

Oil Circuit Breakers (1021)

Allis-Chalmers Mfg. Co. has issued a 4-page bulletin on their Type DZ-40A oil circuit breakers. According to the bulletin, these are rated 2000 amp. or less, 15,000 volts, 100,000 kva. interrupting capacity. They are equipped with "Quick-Quench" ruptors and arranged for either manual or electrical operation.

Low Maintenance Motors (1022)

An 8-page bulletin concisely describing a complete line of Allis-Chalmers Mfg. Co.'s Lo-Maintenance motors in ratings from ¾ to 75 hp., open, enclosed and splash-proof types, a.c. and d.c., has been recently released by this company.

Protective Caps (1023)

For use in securing maximum protection on distribution circuits, several types of protective gaps are described in an 8-page booklet of Westinghouse Electric & Mfg. Co. Application, construction, and identification are discussed. Also described are insulated gaps designed to isolate the secondary neutral of a

Crapo
GALVANIZED STEEL
STRAND

STRENGTH, ruggedness and durability are combined with definite economy in *Crapo* Galvanized Steel Strand. Low first cost, low maintenance expense are matters of record wherever this time-tested product is in use. Available in all standard grades and sizes from representative jobbers throughout the country. Or, write—

INDIANA STEEL & WIRE CO.
MUNCIE, : : INDIANA

JEFFRIES

TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements—call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles, Calif.

HIGHER POWER FACTOR WITH A
FAST CAPACITOR
INSTALLATION

IS A GOOD ANSWER TO PROBLEMS OF:

OVERLOADED FEEDERS
LOW VOLTAGE LEVEL
HIGH LINE LOSSES

15 KVA 2400 VOLT
POLE TYPE CAPACITOR

JOHN E. FAST & CO.

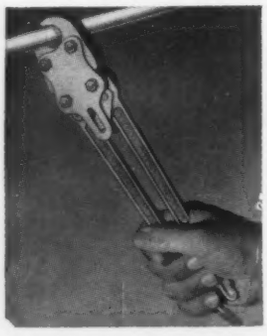
CAPACITOR SPECIALISTS FOR 22 YEARS

3123 NORTH CRAWFORD AVENUE CHICAGO, ILLINOIS

West Coast Representatives: WALTHAM, DE WITT & KRUSI, 630-632 Monadnock Building, San Francisco, California

And there's just as much difference between the *streamlined* BRIEGEL METHOD of making connections and former old-fashioned methods.

The BRIEGEL METHOD saves you up to 50% on time and a substantial saving on materials, allowing you a larger margin of profit on each job. Make quick, easy, strong and neat connections this MODERN way.



No extra turns or twists, no nuts to tighten when you use B-M connectors and couplings. Just TWO SQUEEZES with the patented B-M indenter (which costs you only $1.25) and you have a smooth efficient job. Approved by Underwriters Laboratories.

DISTRIBUTED BY

The M. B. Austin Co., Chicago, Ill.
Clayton Mark & Co., Evanston, Ill.
Clifton Conduit Co., Jersey City, N. J.
General Electric Co., Bridgeport, Conn.
The Steelduct Co., Youngstown, Ohio
Enameled Metals, Pittsburgh, Pa.
National Enameling & Mfg. Co., Pittsburgh, Pa.
Triangle Conduit & Cable Co., Elmhurst, N.Y.C.

BRIEGEL METHOD TOOL CO., Galva, Ill.

ELECTRIC CONTROLS FOR EVERY PURPOSE FROM ONE SUPPLIER

IN the Ward Leonard Line you will find the control that exactly meets your requirements and one that assures the dependable and maximum operation. Specific Bulletins available covering Motor Starters, Controllers and Speed Regulators large and small, Relays of various types and contact combinations, Resistors and Rheostats for every industrial service. Send for Bulletins of interest to you.

WESTERN REPRESENTATIVES

Raymond Ackerman
318 Dooly Block
Salt Lake City, Utah

Northwestern Agencies
2411 First Avenue
Seattle, Wash.

A. R. Slimmon
445 East 3rd Street
Los Angeles, Calif.

Electric Material Co., Inc., 163 2nd Street, San Francisco, Calif.

WARD LEONARD

48 SOUTH STREET MOUNT VERNON, N. Y.

ELECTRIC CONTROL DEVICES SINCE 1892

distribution transformer from the primary lightning arrester ground during normal conditions. The use of telephone protective gaps when telephone lines are parallel to high tension power lines and mounted on the same poles or towers is discussed along with connections and construction of these gaps.

Ilg Catalog (1024)

A 64-page combined catalog and engineering data book on Universal blowers has been published by the Ilg Electric Ventilating Co. The bulletin features Ilg's four lines of direct-connected and belted blowers, plus the two lines of volume blowers and the construction of the Ilg-built motor. Uses of each type, characteristic curves, dimensions and performance data are included.

Metal Strains (1025)

A booklet reporting in detail the value of five different metals for strain purposes under conditions which involve exposure to corrosion, as well as to high and low temperatures, has been published by the International Nickel Company, Inc.

40th Anniversary Catalog (1026)

National Telephone Supply Company, celebrating its 40th anniversary, has issued a 65-page catalogue of their complete line of communication and power line specialties. The catalog illustrates and describes National products and gives instructions in their use.

Miniature Units (1027)

Miniature a.c. and d.c. voltmeters and ammeters in the 2-in. classification for general use are described in a 12-page bulletin of Westinghouse Electric & Mfg. Co. Full scale readings on the d.c. ammeter series are from 20 microamperes to 100 amperes and on the a.c. units, from 5 milliamperes to 50 amperes. Voltmeter calibrations are from 5 millivolts to 1000 volts full scale on both a.c. and d.c. lines. Operation and construction are described with a note on repulsion vane types for a.c. circuits. Typical instruments are illustrated and cutaway views show construction details.

Power Cavalcade (1028)

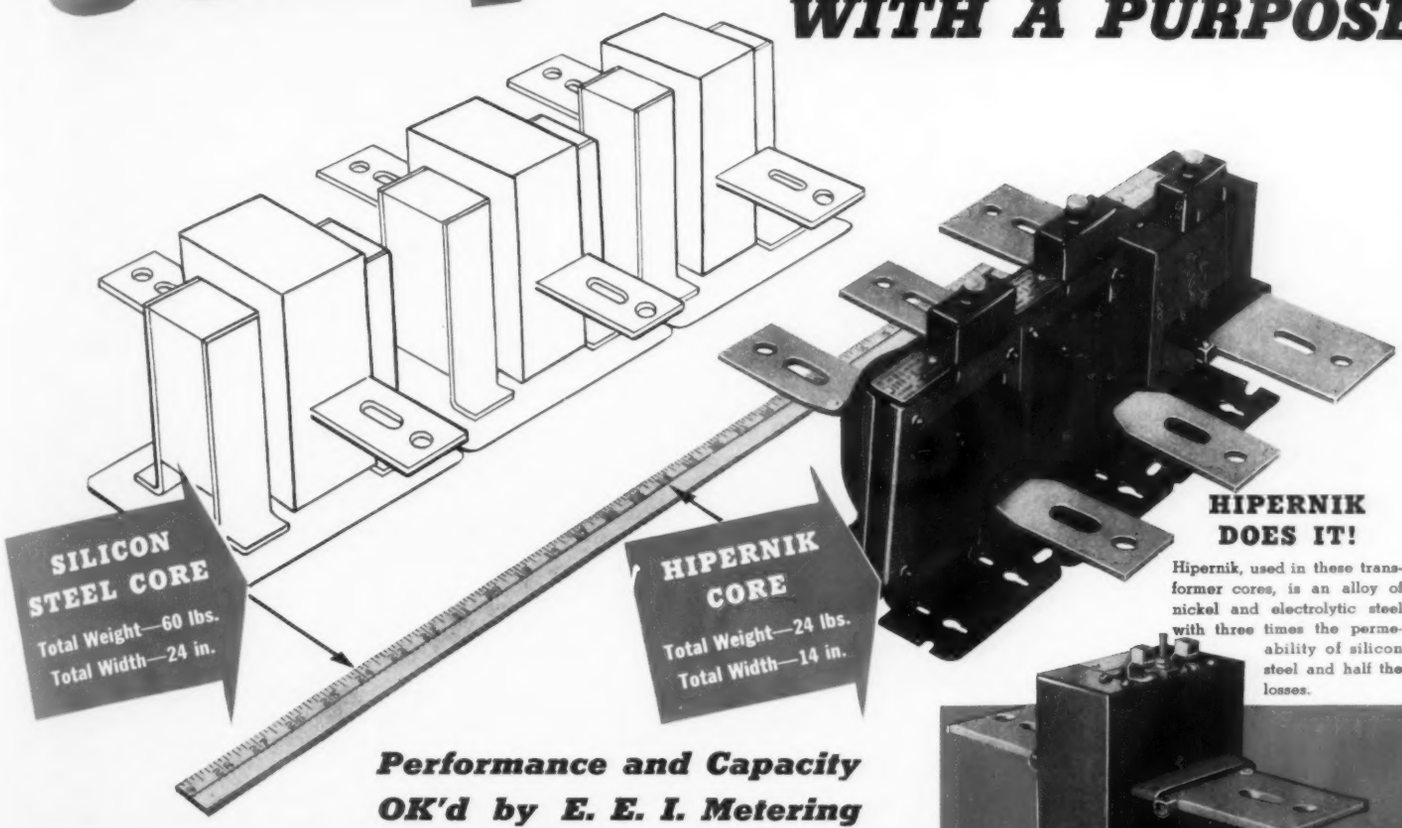
The Far West's great cavalcade of power development is reviewed in text and picture in a special issue of "The Hubbard Linebuilder" prepared by the Pacific Coast offices of Hubbard and Co. at Emeryville. This is a striking pictorial presentation with valuable factual material on current power developments.

Capacitors (1029)

Capacitors with ratings from 2½ to 180-kva., 230 to 4160 volts, for outdoor mounting on poles or cross arms are described in a 12-page bulletin of Westinghouse Electric & Mfg. Co. Application, distinctive features, and construction details are discussed, special attention being given to discharge devices, terminal bushings, and overcurrent protection. Complete information on mounting methods and brackets is explained and illustrated with diagrams of typical installations. Outline drawings give physical dimensions of the more common capacitor sizes. A tabulation gives ratings, weights and styles.

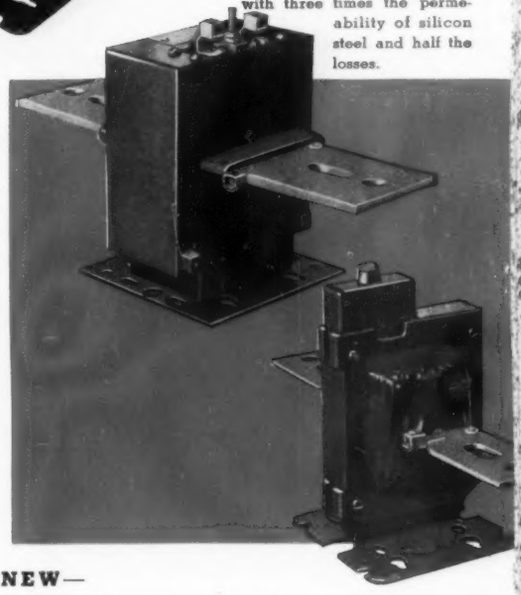
HERE'S compactness

WITH A PURPOSE!



HIPERNIK DOES IT!

Hipernik, used in these transformer cores, is an alloy of nickel and electrolytic steel with three times the permeability of silicon steel and half the losses.



Performance and Capacity OK'd by E. E. I. Metering Committee, yet Type UE and WE Current Transformers are 50% lighter and 40% smaller.

Hipernik, in these dry type, indoor current transformers, lets eight pounds of transformer do the work that used to require twenty. Mounting dimensions, performance, and overload capacity meet all E. E. I. requirements.

ACCURACY AT 200% CURRENT is fully maintained and both the WE and UE can be operated continuously at 150% normal current without exceeding 55 degrees C. temperature rise with 40 degrees C. ambient.

RIGID UNIFORM CONSTRUCTION provides unusual strength against mechanical effects of instantaneous overcurrent. Standardized base mounting dimensions and primary terminals permit interchangeability among the three current ratings and other makes.

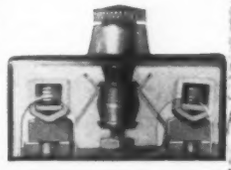
ALL RATINGS CARRIED IN STOCK.

SIMPLE INSTALLATION is a result of compactness plus improved design. Wiring of both types is simplified by the use of solderless secondary connectors and a solderless primary potential tap. For more information, get F-8582, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

NEW—

(1) Secondary terminal covers are made of clear plastic, permitting easy examination of connections.

(2) Semi-Automatic Short Circuiting Device.



These new transformers are available in the following ratings, 600 volts, 60 cycles: WE, 200/5 and 400/5 amperes; UE, 600/5 amperes.

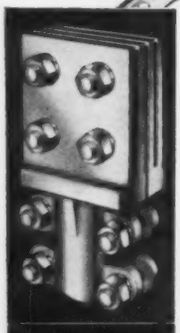
J-70336

Westinghouse Transformers

The MOST COMPLETE
LINE OF
Conductor Fittings

FLEXIBLE BRAID connections, any rating, single or multiple.

You need a Penn-Union Catalog, to have an idea of the immense variety of connectors we make. Practically every good type—*in a complete range of sizes.*



STUD CONNECTORS for single or multiple flat bus, to tubing or cable.

BUS SUPPORTS of many types, standard and special — for tubing, bar or cable. Bus bar clamps, spacers.

CLAMP TYPE elbows, straight connectors and reducers, tees, cross connectors, terminals.

HINGED E-Z TEE takes a wide range of conductor sizes. Many other types of tees.

DEAD-END CLAMPS and complete line of U-clips, nuts and washers.

Also Terminal Lugs, Service Connectors, Cable Taps, etc. See Catalog.

Every fitting is Dependable, mechanically and electrically. That's why so many of the largest users have standardized on PENN-UNION.

NORTHWESTERN AGENCIES
2411 First Ave., Seattle, Washington
F. M. NICHOLAS CO.
1123 Harrison St., San Francisco
KENNETH ANDERSON CO.
2115 So. San Pedro St., Los Angeles
Penn-Union Electric Corp., Erie, Pa.

PENN-UNION
Conductor Fittings

Two-In-One (1030)

A 4-page illustrated catalog section on Two-In-One tape has been published by B. F. Goodrich Co. The catalog section describes use of the tape in various services as well as methods of application.

Bus Duct (1031)

A bulletin illustrating and describing the new Bull Dog Lo-X (low reactance type) bus duct has been released by the Bull Dog Electric Products Co. The bulletin describes the new design feeder type duct for large ampere capacities. According to the bulletin, it has been necessary to enclose the large-capacity bus bars in aluminum casings to reduce reactance. In view of the present shortage the large capacity feeder type bus duct has been redesigned to use a steel casing or duct and yet reduce voltage drop from reactance.

Outdoor Switch Houses (1032)

A new bulletin available from Allis-Chalmers Mfg. Co. is on metal-enclosed outdoor switch houses for feeder or line protective switching equipment. Well illustrated, it gives construction features, application data, dimensions and typical design arrangements.

G-E Turbines (1033)

A 78-page book describing G-E's turbine generators in rating from 500 to 7500 kw. has been issued by the company. The publication contains photos and charts which show the major steps in the manufacture of turbine-generator units.

Daybrite Line (1034)

Day Brite Lighting, Inc., has available a new bulletin which covers a complete listing of equipment for 36-in., 65-watt and 60-in., 100-watt lamps, including light strip, reflectors, parts, wired units and show window reflectors. The bulletin gives dimensions and specifications as well as diagramatic and cutaway section views.

Air Circulators (1035)

An 8-page air circulator catalog has been published by Emerson Mfg. Co. describing their line of air circulators. Along with the description, the catalog includes performance information and detailed specifications. Pictured are uses of air circulators extending from the small business to the proper ventilation of large industrial buildings.

IES Tie-In (1036)

As part of the nation-wide light conditioning fall campaign featuring the new I. E. S. lamps, the Mitchell Manufacturing Co. is releasing a new catalog featuring its line of 1941-42 floor and table lamps.

Several new touches have been applied to this year's edition. A third-dimensional effect has been obtained on the cover, through a cellophane window. Two figures are seen gazing through the window upon an interior scene showing lamps attractively set up on a display. The display, in itself a new and important feature of the Mitchell floor lamp merchandising program, is illustrated in full color on the first inside page. The remainder of the book is devoted to the 42 floor and table lamps representing the entire line, all illustrated in full, natural color.

Bull Dog Lo-X (1037)

Bull Dog Electric Products Company has a bulletin on "Lo-X" (low reactance design) BUStribution Duct. The bulletin illustrates and describes design and construction of the duct and gives drop curves on graphs.

EASY WAY TO GET INFORMATION

To keep posted, simply circle the items in which you are interested. cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

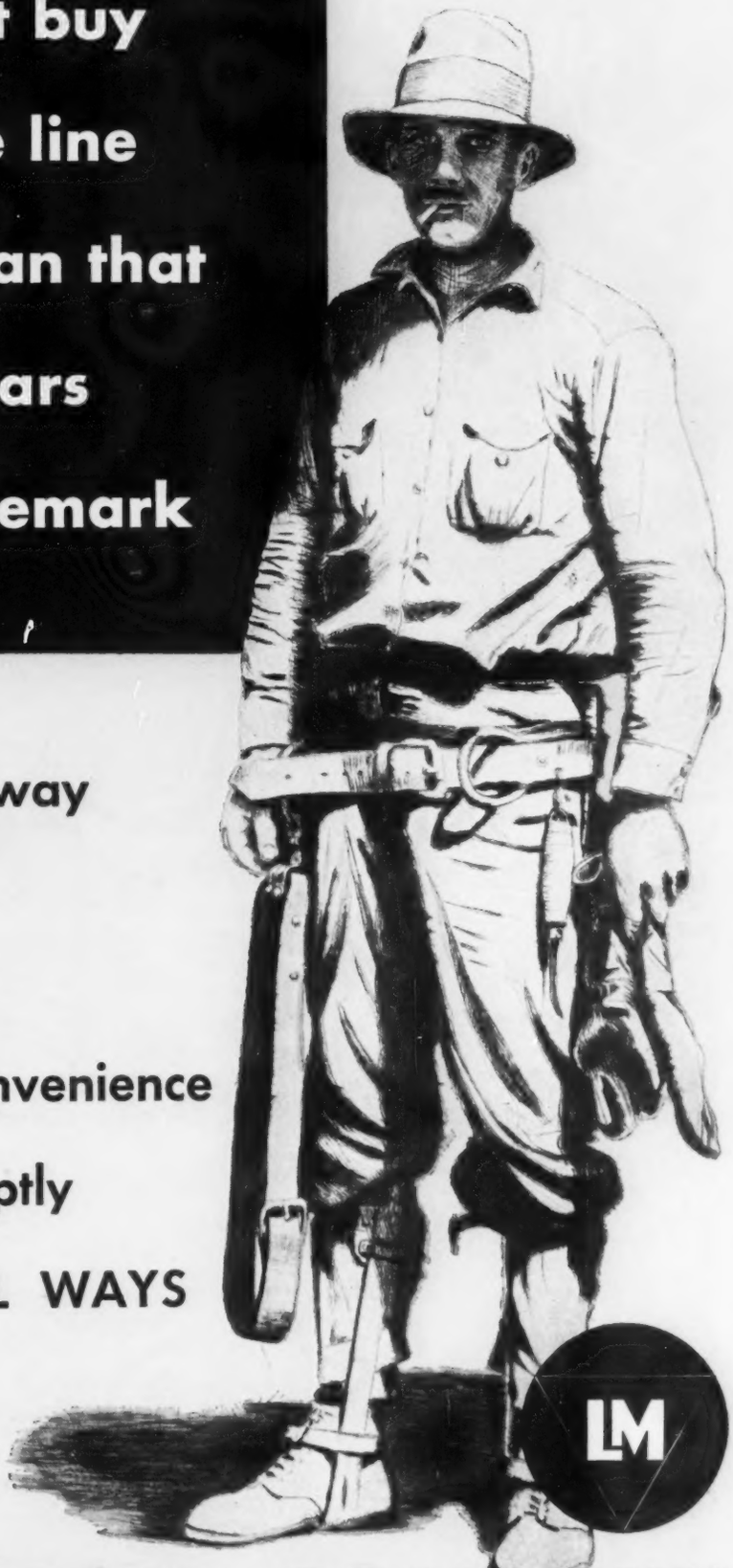
1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010
1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021
1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032
1033	1034	1035	1036	1037						

Name ..... Company* ..... Title* .....

Address

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

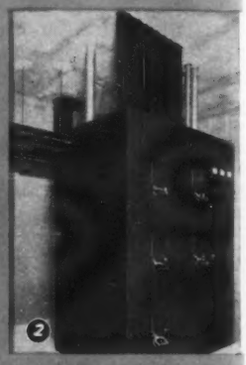
You cannot buy better pole line hardware than that which bears the L-M trademark



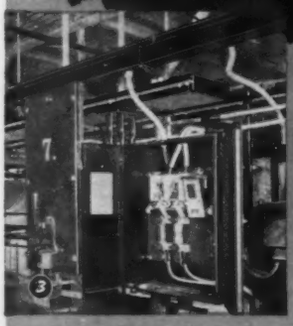
- it is designed the way you want it
- it is built to last
- it is packed for convenience
- it is shipped promptly
- it is RIGHT in ALL WAYS

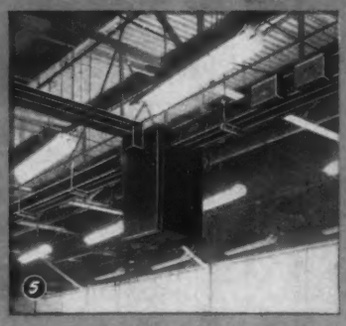
LINE MATERIAL COMPANY

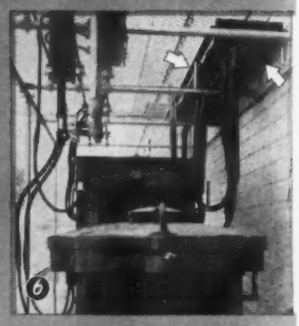
THIS NEW PLANT "Has Everything" FOR FLEXIBLE "PLUG-IN" LIGHT AND POWER



[1] From this outside Transformer Bank No. 1 (3-500 KVA, 3 phase, 220 volts), a short run of Bull Dog 4000 amp. "LO-X" BUStribution DUCT connects transformers through wall to Bull Dog Switchboard No. 1, [2] from which four runs of Bull Dog BUStribution DUCT feed into the plant. One of 1000 amp. "Plug-in" type feeds air compressors and boiler room, one of 1500 amp. "Plug-in" type leads through Maintenance Department and Tool Room to Switchboard No. 2, and

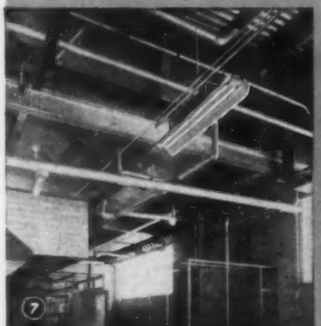


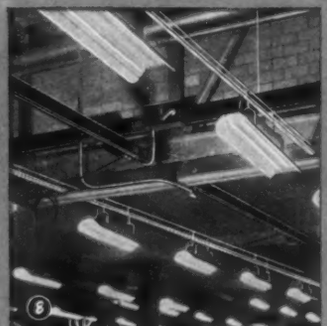


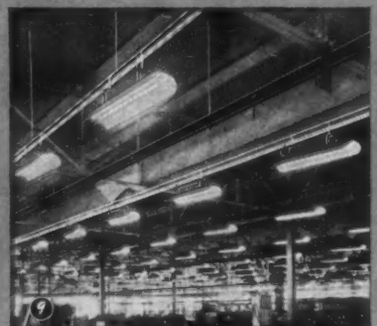


[3] two runs of "LO-X," one of 2000 amp. and one of 1500 amp. feed hydrogen brazing furnaces, as shown above. In the foreground is a run of Bull Dog Kbi-Duct enclosing wires and cables for the furnace control panels directly below. [4] This 325 foot run of Bull Dog 1500 amp. "Plug-in" type BUStribution DUCT which ties in Switchboards 1 and 2, also serves as a power plug-in source for the Maintenance Department and Tool Room.

[5] From this long run of 1500 amp. "Plug-in" type BUStribution DUCT, a run of 750 amp. branches off to the left, the tap-off being made through a Bull Dog 3 Pole 800 amp. Circuit Breaker Cubicle Adapter. [6] This Transformer Bank No. 2 (3-200 KVA) feeds Bull Dog Switchboard No. 2, by means of a 1500 amp. "LO-X" BUStribution DUCT through wall at back of Switchboard, which is tied into Switchboard No. 1 by the







[7] run of 1500 amp. "Plug-in" type Bus Duct coming into switchboard from the left. Outgoing run at top of switchboard is Bull Dog 500 amp. "Plug-in" type, while stepping-off from this run in the upper foreground is a run of Bull Dog "125" Bus Duct. [8] Here is a run of 500 amp. Bull Dog "Plug-in" Bus Duct with runs of "125" "Plug-in" Duct, connected by means of Bull Dog Vacu-Break Bus Plugs in the 500 amp. Duct, and Bull Dog End Cable Tap Boxes in the "125" Duct.

[9] Close-up of one of the 147 ft. runs of Bull Dog "125" Duct, and of several parallel runs of Bull Dog Universal Trol-E-Duct, which feed and support the 200 watt fluorescent lights throughout the entire plant. [10] One of twelve Bull Dog Narrow Column Circuit Master Panels which feed and control runs of Bull Dog Universal Trol-E-Duct, connections being made by conduit and Bull Dog FC-2108 Outlet Box.

THESE PHOTOS of this great new defense plant show how Bull Dog Bus Duct systems provide flexible lighting throughout the plant, and flexible power, with various protective "plugs" for each individual machine. Write for Bulletins 403 and 412 describing these modern wiring systems, or better yet, ask for a call from a Bull Dog sales engineer.

Assembly plants in San Francisco, Los Angeles and Portland assure prompt West Coast service.

BULL DOG
ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
Bull Dog Electric Products of Canada, Ltd., Toronto, Ontario

MANUFACTURERS OF Vacu-Break Safety Switches, Circuit Master and SafToFuse Panelboards, Switchboards, Duct Systems—FOR LIGHT AND POWER

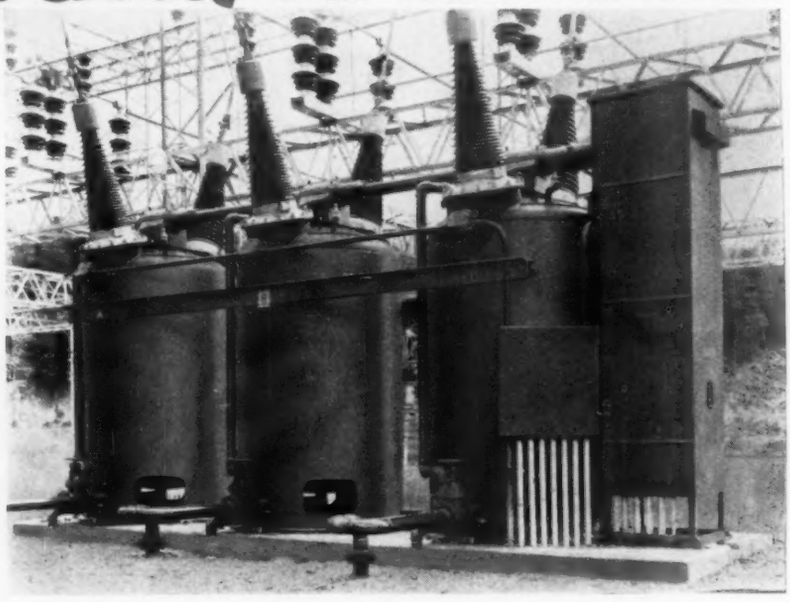
for DEPENDABILITY,
PACIFIC ELECTRIC BREAKERS *operated by*
Motor-Wound SPRINGS

. . OFFER FAST CLOSING AND OPENING WITH IMMEDIATE RECLOSING

Motor Control

WITH SPRING-STORED ENERGY

means no moving parts to wear out when breaker is "ON THE LINE"



Type RWE-64 115-kv. 1200-amperes, 1,500,000-kva., with Type MK-4 Motor Mechanism

When Pacific Electric Breakers are "on the line", there are no moving parts to wear out. The small motor pre-winds springs in the operating mechanism and STORES this energy for fast closing and opening.

That means longer dependability.

Some operating mechanisms leak air, require watchful servicing: de-icing, draining of water and other costly maintenance. But with Pacific Electric's Motor-Wound Spring-Actuated Mechanism you have less maintenance and sure operation. Its fast closing makes synchronizing smooth because closing speed is constant and does not vary with control-current voltage or air pressure. In the event of power failure for the control, the springs may be hand wound.

For 15 years, Pacific Electric has offered Motor Controls operating from low-source alternating current or small batteries, permitting small leads. Short-life rectifiers are not needed. You save on first cost, save on installation cost and have great dependability. You get safety, quick arc extinguishment and great mechanical strength.

Get all the facts on Pacific Electric Breakers—backed by 35 years of specialized manufacturing experience. See why the spring-stored energy of the Motor Control offers added dependability.

C. H. CUTTER
1006 Securities Bldg.
Seattle, Wash.

•

G. B. KIRKWOOD
437 S. Hill St.
Los Angeles, Calif.

•

U. N. HALLIDAY
230 U. S. Nat'l Bank Bldg.
Denver, Colo.

•

MYRON SWENDSEN
P. O. Box 156
Boise, Idaho

•

ELECT. STEEL FOUNDRY
P. O. Box 2696
Honolulu, T.H.

•

R. ACKERMAN
318 Dooley Block
Salt Lake City, Utah

•

J. E. REDMOND CO.
448 W. Madison St.
Phoenix, Ariz.

•

FRANK DARLING & CO. LTD.
1144 Homer St.
Vancouver, B. C.

•

NORTHWEST SUPPLY CO.
909 E. 2nd St.
Butte, Mont.

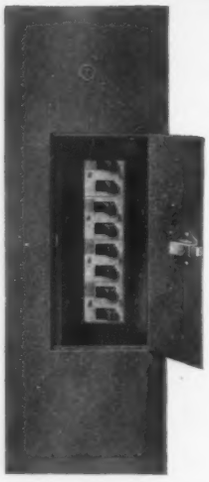
•

Other Representatives in Principal Cities

Pacific Electric Mfg. Corporation

5815 THIRD ST., SAN FRANCISCO, CALIF. DUNES HIGHWAY, GARY, INDIANA

GET SET FOR "3 shift lighting"



COLUMN TYPE LIGHTING PANEL

MORE people will be working late hours and night shifts this winter than in many years past . . . in the interests of National Defense.

They'll create an immediate need for more light in quantity and better light in quality in thousands of old and new buildings. In most cases the first step should be installation of . . .

TRUMBULL

MULTI-BREAKER Lighting Panels

These are the ideal panelboards for lighting modernizations under the Defense Program.

First, because they offer circuit breaker protection at low cost . . . positively protecting vital lighting circuits, yet permitting restoration of service after short circuit "by the flip of a switch", with no fuses or other parts to renew.

Secondly, because they are extremely compact and available also in COLUMN TYPE to fit within the web of standard 8" and 10" "H" beam factory columns. Write for Trumbullaid Circular 309.

TRUMBULL

ESTABLISHED 1899

THE TRUMBULL ELEC. MFG. CO.

PLAINVILLE CONN. U.S.A.

A GENERAL ELECTRIC ORGANIZATION

KEEP *Alert* ELECTRICALLY use your TRUMBULLAIDS

Factories at SEATTLE — SAN FRANCISCO — LOS ANGELES

MAGAZINES *in quick review*

Second National Lighting Show in print is staged by *Wholesaler's Salesman* in its September issue. It covers the field from trends in lamps and the lighting market sweeping through "lighting tools, fluorescent techniques, contractors' selling light for profit, fluorescent lighting in industry, retail lighting, protective lighting, sun lamp market, drying lamps, architectural lighting, residential lighting, Christmas decorative lighting" and ends with a "lens-eye visit to the Fluor-O-Lier and RLM lighting futurama" recently on tour in 15 eastern cities.

* * *

"Lighting and Air Conditioning Design Factors," is an important paper contained in the Sept. issue of *Illuminating Engineering*. Effect on air conditioning of radiation and heat gain resulting from lighting sources is studied in this paper. Another valuable reference work in the issue is a revised edition of "Illuminating Engineering Nomenclature and Photometric Standards" brought up to date since 1932 and submitted to the American Standards Assn.

* * *

Apprenticeship standards for the electrical construction industry are discussed in *Qualified Contractor* for September. Various phases of the subject are treated by U. S. Dept. of Labor and contractors and labor organizations in cooperation.

* * *

"Let's Talk About Union Labor" is a thought-provoking and stimulating article by Earl Whitehorne in the Sept. *Electrical Contracting*.

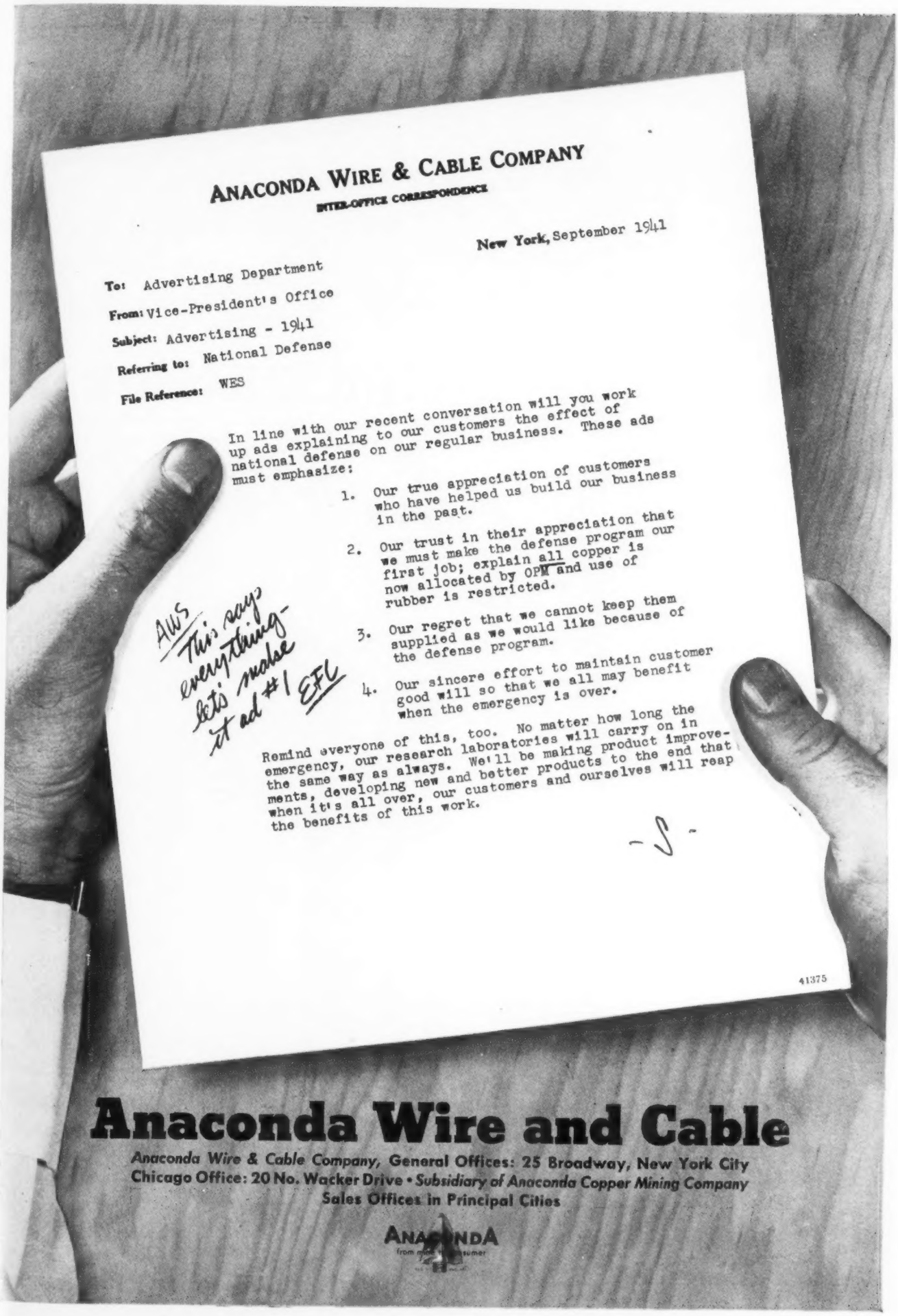
BOOKS *you may want*

ELEMENTS OF ELECTRICAL ENGINEERING, fourth edition, by Arthur L. Cook. John Wiley & Sons, Inc., $4.00. A textbook of principles and practice. Intended as a short course for electrical students, and also for non-electrical students in colleges. Several chapters of this popular text has been rewritten and much new material added to bring it up to date, notably the chapters on "Light and Illumination" and "Electronic Devices." Tables which deal with motor circuits and their protection have been revised to conform with provisions of the new 1940 National Electrical Code. Also an entirely new set of problems has been added.

The book is intended as a text primarily for advanced students in electrical engineering. Some of the explanations and mathematics are far beyond high school and trade school students, and the book would be of little value for this class of schools. Nor can it be considered as a reference book for either electrical engineers or technicians, although it might well be used for utility training courses for operators. It is one of the best books of its type on the market today.

* * *

The 56th annual edition of the *Engineering Index* has been published by Engineering Index, Inc., and contains 26,000 annotations of articles appearing in domestic and foreign current technical publications, including 40,000 cross-references to annotations. Also included is an author and contributor's index of 19,000 names. All branches of engineering are included in the volume which sells for $10.


ANACONDA WIRE & CABLE COMPANY
INTER-OFFICE CORRESPONDENCE
New York, September 1941
To: Advertising Department
From: Vice-President's Office
Subject: Advertising - 1941
Referring to: National Defense
File Reference: WES
In line with our recent conversation will you work up ads explaining to our customers the effect of national defense on our regular business. These ads must emphasize:
1. Our true appreciation of customers who have helped us build our business in the past.
2. Our trust in their appreciation that we must make the defense program our first job; explain all copper is now allocated by OPM and use of rubber is restricted.
3. Our regret that we cannot keep them supplied as we would like because of the defense program.
4. Our sincere effort to maintain customer good will so that we all may benefit when the emergency is over.
Remind everyone of this, too. No matter how long the emergency, our research laboratories will carry on in the same way as always. We'll be making product improvements, developing new and better products to the end that when it's all over, our customers and ourselves will reap the benefits of this work.
-S-
AWS This says everything- let's make it ad #1 EFL
41375
Anaconda Wire and Cable
Anaconda Wire & Cable Company, General Offices: 25 Broadway, New York City
Chicago Office: 20 No. Wacker Drive • Subsidiary of Anaconda Copper Mining Company
Sales Offices in Principal Cities
ANACONDA

YOU WILL FIND ALL OF THE WIRING MATERIALS YOU NEED IN THE G-E LINE FOR INSTALLING MODERN LIGHTING

THE PROPER WIRING MATERIALS TO SERVE *Good Lighting*

G-E wiring materials are high quality and are designed to be used together. The line is complete. What is more, you can obtain them right in your own territory. G-E merchandise distributors are located at all key points in the country.

G-E CONDUIT PRODUCTS

G-E White rigid conduit is hot-dipped galvanized and will provide lasting protection for wiring systems. G-E Black rigid conduit is coated with a corrosion-resistant, elastic black enamel. Also available are G-E flexible conduit, E.M.T., Fiberduct underfloor raceway, BraidX and BX.

G-E WIRE AND CABLE

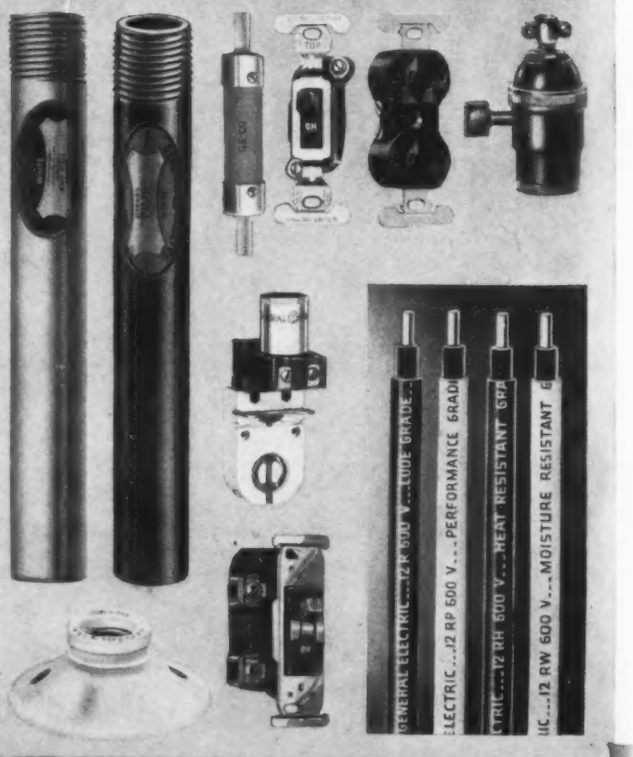
Four grades of G-E building wires are available—Type R, Code grade; Type RP, Performance grade; Type RH, Heat-resistant grade; Type RW, Moisture-resistant grade. G-E Type RW wire can be used in conduit in lieu of leaded cable where moisture is a problem. Flamenol Type SN small diameter wire is designed for rewiring raceways.

G-E WIRING DEVICES

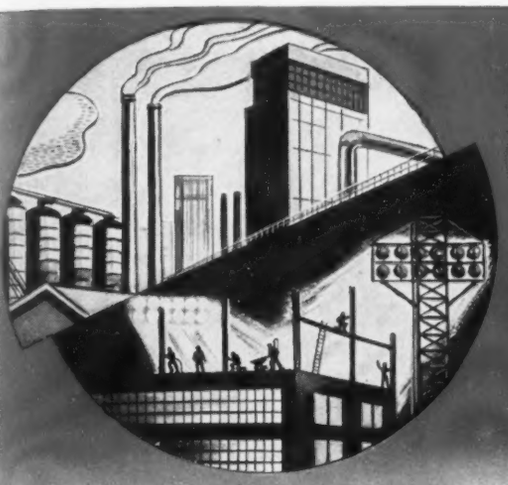
Hundreds of different G-E wiring devices are available—sockets, Fluorescent lampholders and starters, receptacles, convenience outlets, switches, plates, fuses, branch circuit breakers, etc. Existing devices are improved constantly and new devices are added.

For further information about G-E wiring materials, see the nearest G-E Merchandise Distributor or write to Section CDW-1180, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

SOME OF THE G-E WIRING MATERIALS TO SERVE LIGHTING



GENERAL ELECTRIC



Day and Night... WAGNER TRANSFORMERS ARE FURNISHING DEPENDABLE POWER TO HELP SPEED *our* NATIONAL DEFENSE PROGRAM

IN DEFENSE INDUSTRIES . . . power plants . . . air ports . . . government construction work — wherever the use of dependable electric power is an important factor, you will find Wagner transformers doing their part in speeding up our national defense program.

Wagner transformers, through 50 years of service to industry, have proved their ability to furnish unfailing power, and it is only natural that they should be selected for the key points of power distribution in this time of national emergency.

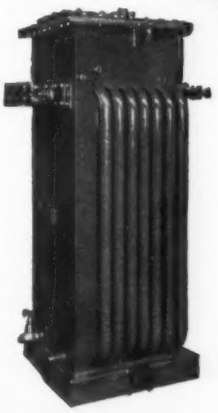
Wagner builds all types and sizes of power and distribution transformers including stud-bushing type; primary-pocket-stud type; sub-station and sub-way types; single or three phase; rural line; air cooled; Noflamol; and Type YH Constant-Current Regulator.

Because of large plant capacity, vast manufacturing facilities, and 50 years of engineering and manufacturing experience, Wagner can give immediate attention to all your transformer requirements.

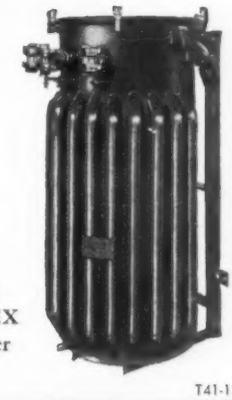
10,000-KVA Wagner Power Transformer

Send for Complete Literature

For complete descriptive literature on the design and construction of Wagner transformers write for bulletins TU-180 (distribution) and TU-181 (power).



150-KVA Wagner Noflamol Transformer



75-KVA Wagner HEX Transformer

The Wagner Electric Corporation is fully aware of its responsibility, as a unit of American Industry, in producing sufficient material and equipment for national defense—fully aware of the importance of *speed* and *efficiency* in this vast undertaking confronting our country.

Now, more than ever, it is, and shall be, Wagner's policy: to render the quickest and most dependable service to its customers, to maintain the same high quality of product for which Wagner is known; and to cooperate 100% with the national program of making this country invulnerable to the aggressive ambitions of foreign nations.

T41-13

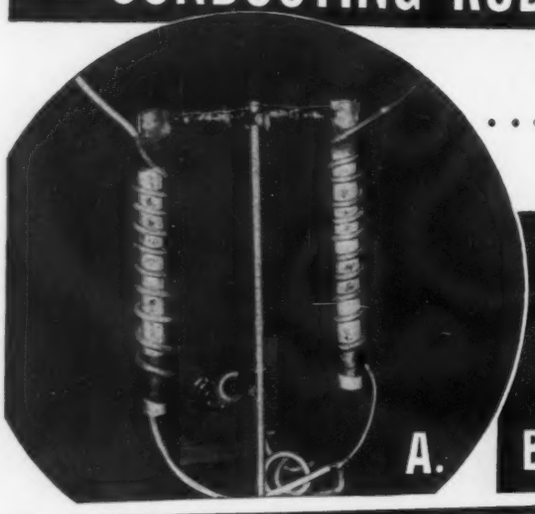
Wagner Electric Corporation

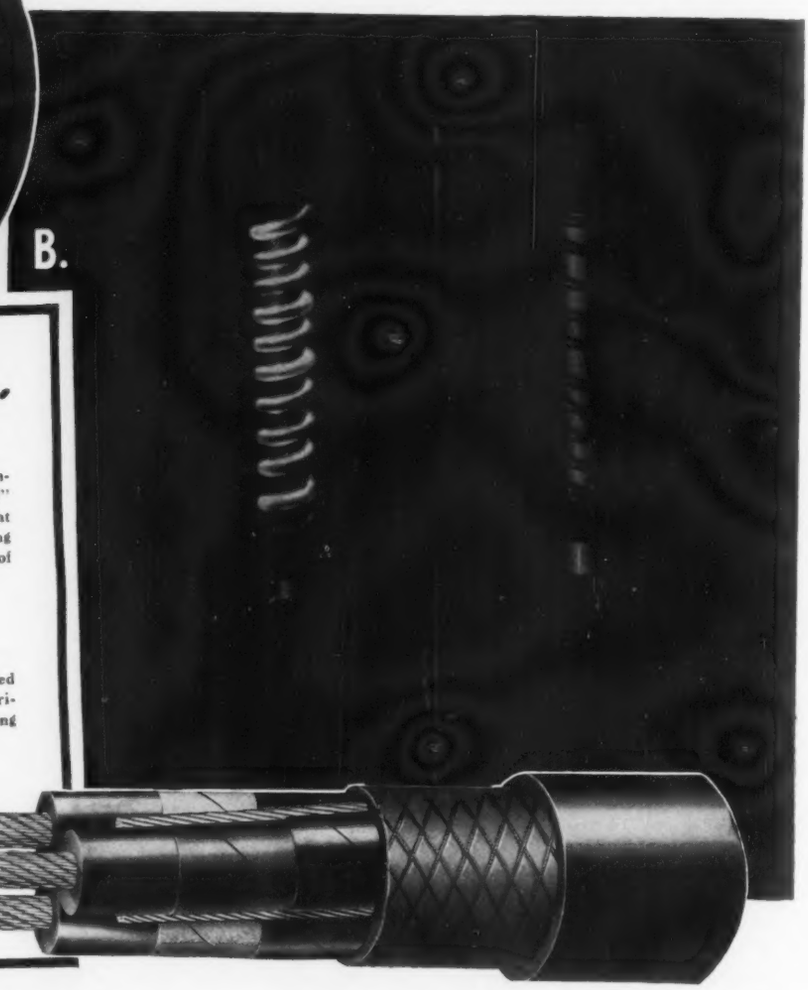
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

TRANSFORMERS • MOTORS • FANS • BRAKES

CONDUCTING RUBBER makes it possible...

Makes any cable insulation "Corona proof" ... dissipates static electricity and adds to the life and safety of POWER CABLES





Look at this test...

A VOLTAGE OFF

Both cables are wrapped around mandrels. The conductor on the left is insulated with "ozone proof" rubber, but not shielded. The conductor on the right has the same type of insulation with a surface covering of CONDUCTING RUBBER—same total thickness of wall in each case.

B VOLTAGE ON

Visible corona appears at the surface of the unshielded conductor on the left. On the second conductor, American Steel & Wire Company's Type PS Semi-Conducting Shielding prevents corona formation.

Amerclad rubber-sheathed shovel cable with Type PS Semi-Conducting Shielding. Note ground wires between shielded conductors.

TYPE PS Semi-Conducting Shielding (conducting rubber), a new development by American Steel & Wire Company, solves an old and troublesome problem in the manufacture of insulated cables. By research and by experience, we have proved that Type PS Shielding completely eliminates the deteriorating effects of corona by preventing corona formation. Besides controlling "electronic ionization of air," it also:

1. Increases the life of power cables and widens the range of applications.

2. Protects against shock hazard by providing a grounded exterior.

3. Prevents electrical disturbances from being radiated from the cable or absorbed by it.

Type PS Semi-Conducting Shielding is always in intimate contact with the cable insulation proper. When used with rubber insulation, it adheres to the rubber and becomes an integral part of its surface. By preventing corona and consequent generation of ozone, Type PS Shielding permits the use of standard rubber insulating compounds for high voltage service. No longer is it necessary to employ oil-base compounds in which some degree of corona-resistance is obtained only by sacrificing such typically rubber-like qualities as tensile strength, elasticity, ability to withstand heat and to resist deformation.

Write today for our technical bulletin and other information.

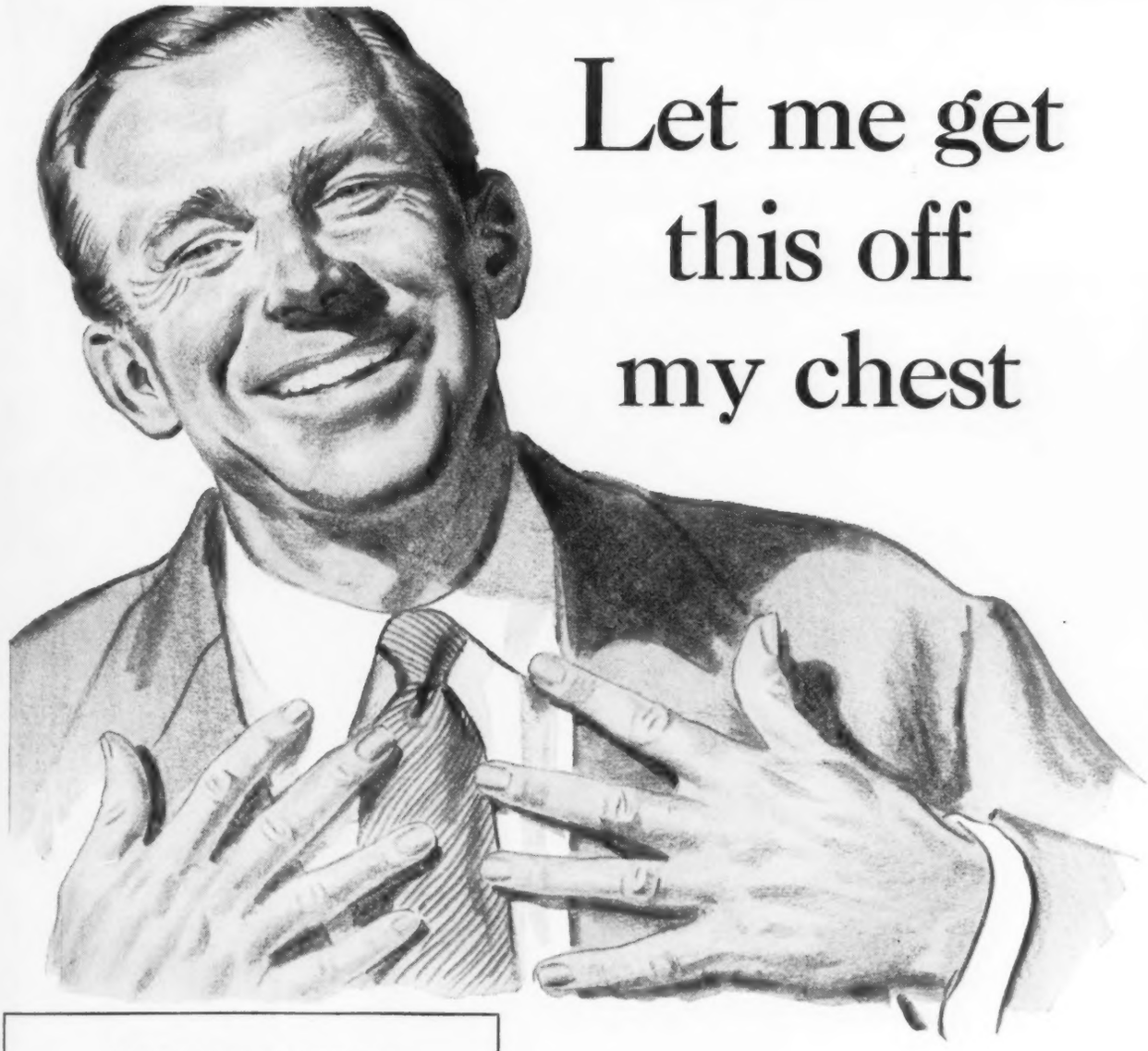
COLUMBIA STEEL COMPANY, *San Francisco, Pacific Coast Distributors of U·S·S Electrical Cords and Cables*

Manufactured by

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*

United States Steel Export Company, New York

UNITED STATES STEEL



Let me get this off my chest

SHELL'S SAFETY FACTORS PROVIDE

- Better control of friction heat
- Better control of combustion heat
- Slower rates of wear
- Increased power off-take
- Savings on shutdown losses
- Reduced outlay for lubricants

I'M NO "lubrication analyst"... just a plain, hard workin' salesman. An' proud of it.

I guess anybody'd be proud to sell what I've got in Shell's famous SAFETY FACTORS. Yep, 821 scientists and assistants, representin' a lot of the best lubrication brains in America, helped develop these Safety Factors.

So when I come and knock on the door, don't expect a "lubrication analyst," or even a Phi Bete. I've got something plenty better'n that to offer you — I've got SAFETY FACTORS — and in 10 minutes I can prove their value to you.

Your Shell Salesman

the World's Longest Stretch

OF LIGHTED HIGHWAY (QUEEN ELIZABETH WAY *TORONTO TO NIAGARA FALLS*)

...*Another* highway with all lighting automatically controlled by the ...*SIMPLE, DEPENDABLE* WESTON *PHOTRONIC METHOD

WESTON *PHOTRONIC Illumination Control

The most practical, most economical lighting control for streets and highways, airways, plant illumination, etc. Employs the proved, self-generating WESTON Photronic Cell. No amplifying equipment necessary. Cell can be mounted any distance away from relay cabinet. Permits independent setting of both the "on" and "off" illumination values. Uses no energy when not operating; consumes but 2 watts during a 1 minute operating cycle. Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.

**PHOTRONIC—A registered trademark designating the photoelectric cells and photoelectric devices manufactured exclusively by the Weston Electrical Instrument Corporation.*

Laboratory Standards . . . Precision DC and AC Portables . . . Instrument Transformers . . . Sensitive Relays . . . DC, AC, and Thermo Switchboard and Panel Instruments.

WESTON

Specialized Test Equipment . . . Light Measurement and Control Devices . . . Exposure Meters . . . Aircraft Instruments . . . Electric Tachometers . . . Dial Thermometers.

FOR OVER 50 YEARS LEADERS IN ELECTRICAL MEASURING INSTRUMENTS

WESTERN REPRESENTATIVES

Seattle, Wash.
Eicher & Bratt,
263 Colman Bldg.

San Francisco, Calif.
Herman E. Held,
420 Market St.

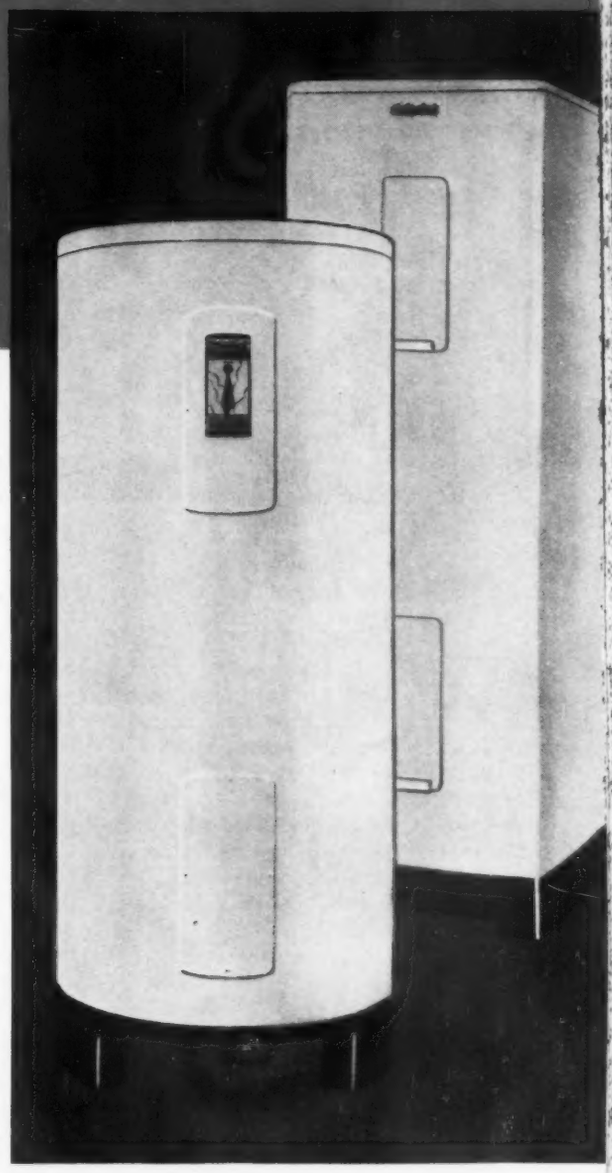
Los Angeles, Calif.
Edward S. Sievers,
417 So. Hill St.

Denver, Colo.
Howard Peterson,
1921 Blake St.

Phoenix, Ariz.
J. E. Redmond Co.,
448 W. Madison St.

PRINT IN BINDING

Electric Water Heaters Are on the March . . .



. . . And Hotpoint Leads the Parade

THE trend of electric water heating sales is through retailer outlets. Never has the future been so bright for reaping big profits from electric water heating. And Hotpoint provides a plan for securing this desirable business.

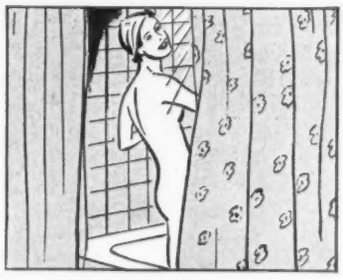
Read below the reasons why electric water heating offers you a great future. Then get in touch with your Hotpoint distributor and arrange to cash in with Hotpoint Automatic Electric Water Heaters. Edison General Electric Appliance Company, Inc., 5612 West Taylor Street, Chicago, Illinois.

Electric Water Heater Sales Are Growing by Leaps and Bounds

More Homes Are Being Built—Each new home in America's great building program needs hot water service. All are prospects for modern Hotpoint Automatic Electric Water heating.

More Interest by Utility Executives—Utility leaders are encouraging the sale of electric water heaters. Retailers selling Hotpoint enjoy the cooperation of such utility leaders.

More Electrified Farm Homes—The number of farm homes with electric service and running water is greatly increasing. And all are prospects for Hotpoint Electric Water Heaters.



Fifteen Million Wired Homes—— enjoy favorable water heating rates and the market is still growing. Hotpoint Electric Water Heaters are a salable, profitable appliance for dealers.

HOTPOINT WATER HEATERS

Offer More In Every Way because . . .

1. **Hotpoint** has Calrod, the sealed electric immersion unit of great speed, long life.

2. **Hotpoint** gives you public acceptance backed by 32 years of national advertising.

3. **Hotpoint** offers you the chance to sell more electric water heaters because more people buy Hotpoint than any other make.

4. **Hotpoint's** research staff continues to seek improvements that render greater service to customers.

5. **Hotpoint** *is the world's largest manufacturer* of Electric Water Heaters—produces the most complete line in square and round models.

6. **Hotpoint** *leads in product value,* in sales helps that sell; in consumer acceptance and most important to you Hotpoint leads in sales. You can build with Hotpoint.

Hotpoint

Automatic Electric Water Heaters

ELECTRIC RANGES · REFRIGERATORS · WASHERS AND IRONERS · CLOTHES DRYERS
AUTOMATIC DISHWASHERS · ELECTRASINK · STEEL KITCHEN CABINETS

ELECTRA'S HUSBAND

The Whips and the Jingles

"WHY IS IT," asked Electra looking up from her mending, "that I get these periodic spells of feeling that something terrible is going to happen? It reminds me of the way our old dog used to act back in the middle West when a thunderstorm was in the offing. He would start to howl and then go into the house and crawl under a bed. Do you think I'm catching something?"

"You've already caught it," I answered dropping the current issue of *Newsweek*. "You've got a case of the whips and the jingles. That's a modern ailment that has affected a great number of otherwise healthy, sane, normal Americans. It's a combination of anxiety, frustration and skepticism brought on by the utter confusion in the whole national and international scene. It's the same feeling I heard described by a man at dinner the other night. He has it too."

"It's a relief to know that someone else has it," she interrupted. "I was beginning to think I was getting old. What did this friend of yours say?"

"Well, he thinks that common sense is going out the window in America," I replied, "and in its stead we are developing a kind of dumbness or numbness built around the false notion that 'the government' is going to take care of everything for us. He decried the lack of unity and unanimity of opinion in this most critical emergency of the last nine and a half years of emergencies that this country has gone through. He says that we are passing our privileges and liberties over to government agencies that are not primarily concerned with our problems. He seems to think that the defense program is being totally beclouded by the fanciful flights after social progress and economic equality that have added to the alphabetical government agencies now concerning themselves with every phase of our lives.

"One startling statement that he made was that we can more quickly and more easily make a list of our liberties and privileges today than we can of the restrictions that have been put on them."

"He has something there," Electra interposed.

"Yes, and he cited instances to prove it," I continued. "For instance he pointed out that the electrical industry finds itself in the anomalous position of defending itself against a government that it wants to defend. In the face of the continued attacks against the privately-owned utilities and against so-called monopolies, he argues that one has a right to be skeptical of the sincerity of some of the people in political offices, especially in view of the national defense crisis. He points out that our businesses and our industries are so delicately synchronized that short circuits and stoppages can wreak havoc from which we may never recover. Despite this, he says that we are becoming the greatest spendthrift nation in the world's history with our spending supported on a tax base represented solely by private enterprise and its ability to produce profitably."

"Say this friend of yours talks almost like one of those people that Secretary Ickes labels a fifth columnist," Electra interjected.

"You might think so," I said, "but listen to this: He is as patriotic an American as you'll find in the land. He was an officer overseas in the last world war and he had a real baptism of fire in the Engineers. He has a son just past twenty-one who is rated 1-A in the draft and who will be called any day now. He is putting a definite amount of his monthly salary into defense bonds, although, he like a lot of others, suspects that these bonds are nothing more than printed money. He has bought a batch of tax anticipation bonds to pay the trebled income tax that faces him on next March 15 and he isn't grumbling about it. And finally, he has volunteered for the Home Guard."

"In a lot of ways, he's more patriotic than you are," Electra mused. "But what does he think we can do about it? I'd like to shake this depressed feeling of mine. Didn't he offer any possible remedies?"

"Yes, he did," I answered. "But he was talking more to people in business than to an individual like you. He urged that we do not forget that our right to free speech is one of our most precious privileges. And another is the right of private enterprise when directed toward the common welfare. He believes that the only way the American way of life can be preserved is for the rights of private enterprise to be maintained. To insure this he recommended that business and industry remember that their future rests with those whom they are serving today. The people themselves will say what will survive. He thinks that all of us as individuals should exercise our rights to inquire into the fitness of governmental activities that are not essential and that we ask our lawmakers to see that things not necessary to the common good be dropped. If some of these things are done, there will be a united people and the confusion and skepticism will disappear."

"I think he's right," Electra said in a voice that I knew concluded this discussion.

DESPITE any doubts that may exist, there will be a time when business will be done without priorities and with some of the rationalized system that existed before the defense emergency. For that reason this letter from a medium-sized independent wholesaler to his customers carries a moral:

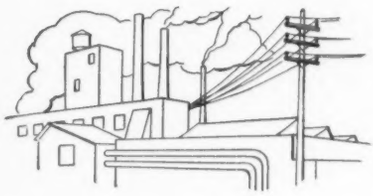
"Due to the fact that the national emergency has materially increased the demands placed upon us for materials, we have had to anticipate our inventory requirements many months in advance of actual needs. As a result of careful planning, we have been able to serve you fairly well.

"Conditions are rapidly changing, however, and many items are now only available at the factory with no definite promise of delivery and at prices in effect at time of shipment.

"Although it is a great temptation to solicit and accept much of the spectacular business which is now available, we take this occasion to state that we will conserve our stocks for the benefit of those who have favored us with their business during less lucrative times. We feel that through this policy we will be supporting the defense program as well as demonstrating loyalty to our regular customers, since most of you are involved in defense work."

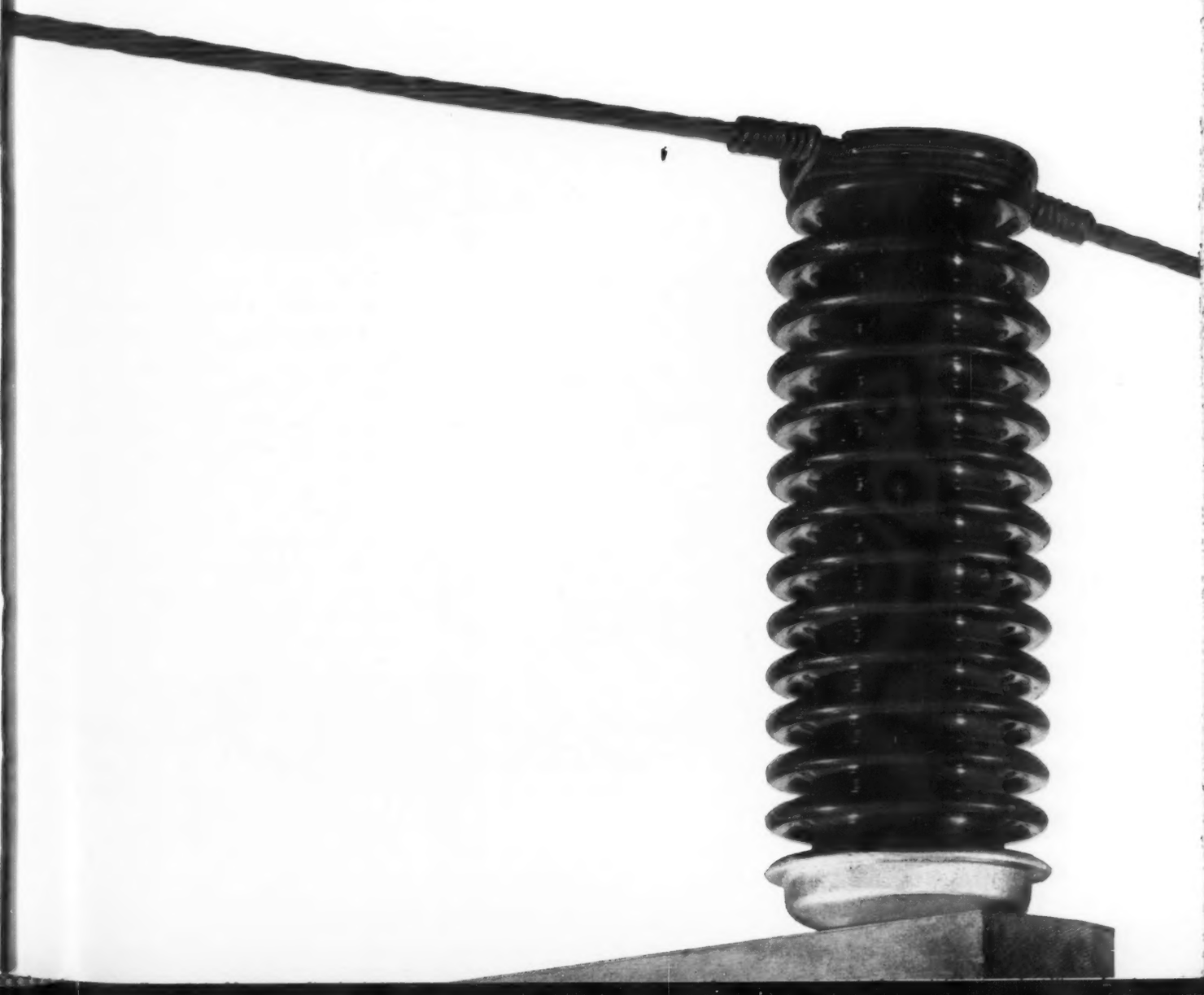
ELECTRA thinks that it was the height of something or other when PG and E President J. B. Black and Vice-President J. P. Coghlan received letters from San Francisco's Mayor Rossi thanking them for becoming members of the Citizens Power Committee favoring the $65,500,000 revenue bond issue.

Power outages mean vital hours lost to defense production. Now is the best time to reinsulate insecure lines and stations on Lapp Posts, the insulators with top service records.



Lapp

LAPP INSULATOR COMPANY, INCORPORATED • LE ROY, N. Y.



Mile-Posts IN THE DEVELOPMENT OF POLE LINE HARDWARE

Pioneered by Hubbard & Company

Ever alert to the problems, ideas and requirements of utility construction and operating men, Hubbard and Company stands out as the outstanding pioneer in the development of so many of today's pole line hardware items. Exemplifying this leadership, Hubbard drive-point bolts, Hubbard ribbed cross-arm braces, Hubbard Peirce secondary racks, Hubbard guy wire protectors and Hubbard steel wing anchors are but a few of the countless Hubbard developments which have become mile-posts in the progressive advancement of pole line hardware. Designed ahead of contemporary progress, Hubbard products serve as the basis of every comparison—***the standard of the industry.***

HUBBARD

Hubbard and COMPANY

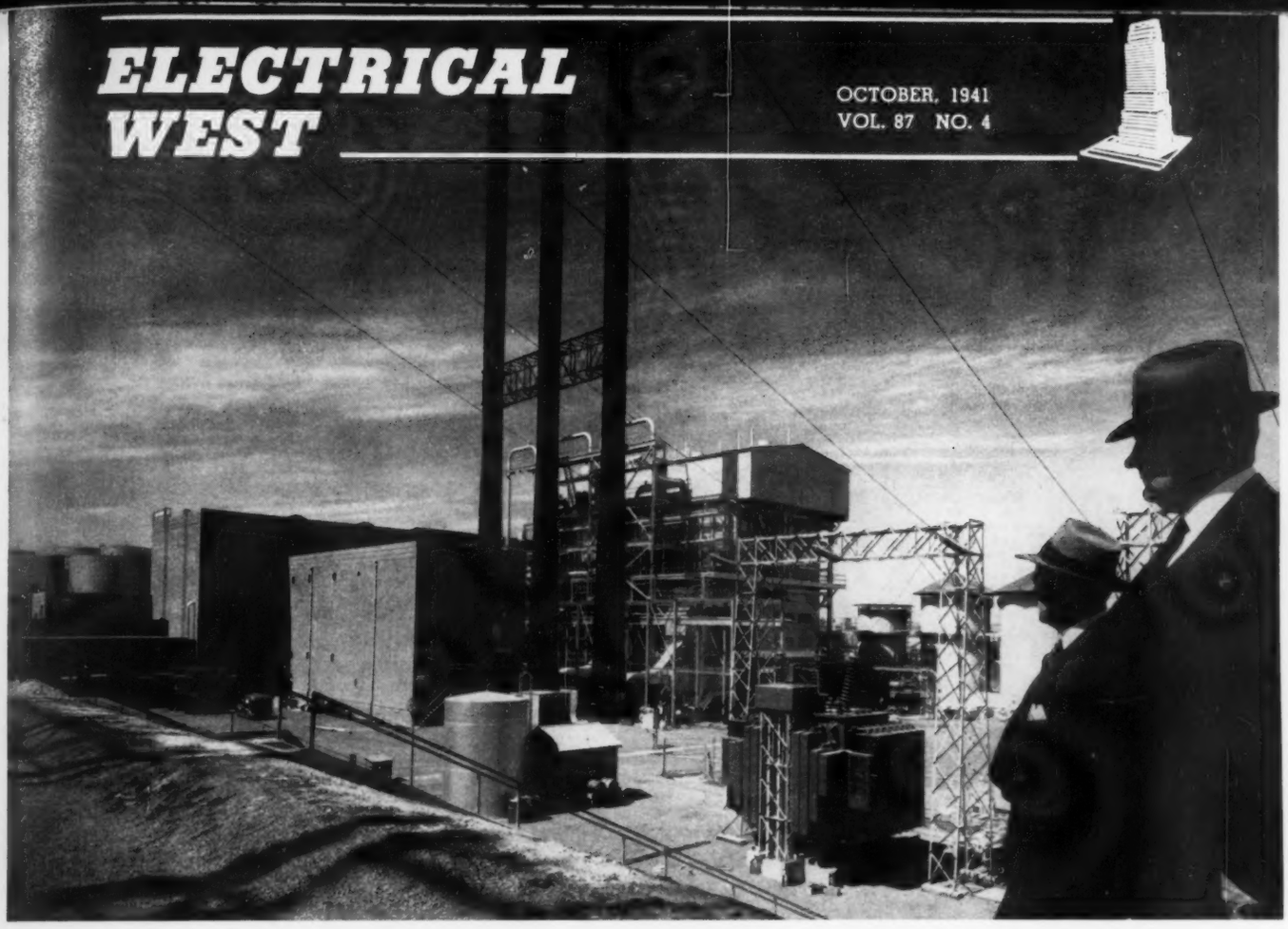
OAKLAND, CAL. PITTSBURGH CHICAGO

HUBBARD

HANG THE LOAD ON HUBBARD HARDWARE

ELECTRICAL WEST

OCTOBER, 1941
VOL. 87 NO. 4



MULTIPLE SERVICE STEAM-ELECTRIC STATIONS

New level of industrial cooperation attained in three PG and E steam plants, aggregating 160,000 kw., that provide power and steam for oil refineries and capacity and energy for the utility system

By P. M. Downing

Vice-President and General Manager
Pacific Gas and Electric Co.

As told

To George Tenney

Editor, ELECTRICAL WEST

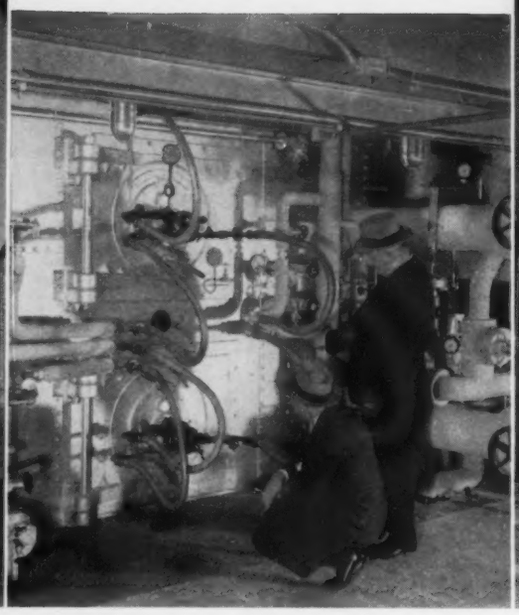
Photographs

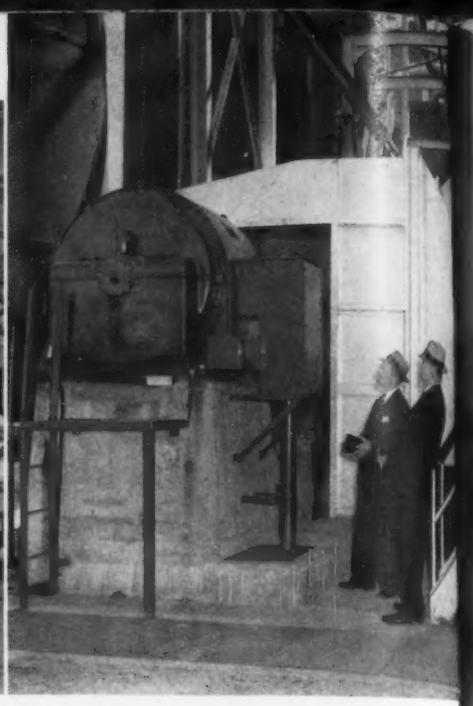
By Fred P. Willcox

WHEN Pacific Gas and Electric Company, with the sanction of the California State Railroad Commission, signed identical contracts with Tide Water Associated, Shell and Union Oil companies for erection of three steam plants adjacent to oil refineries on San Francisco Bay, there was inaugurated a program of economical coordination of facilities beneficial to utility and oil companies alike. The plants assure the oil companies adequate and closely regulated power supplies together with large quantities of process steam. The power company receives in partial payment fuel in the form of refinery wastes such as acid sludge, pitch and petroleum coke. Electric power generated incidental to steam production and in excess of the refineries' requirements becomes an important and economical addition to the Pacific system supply.

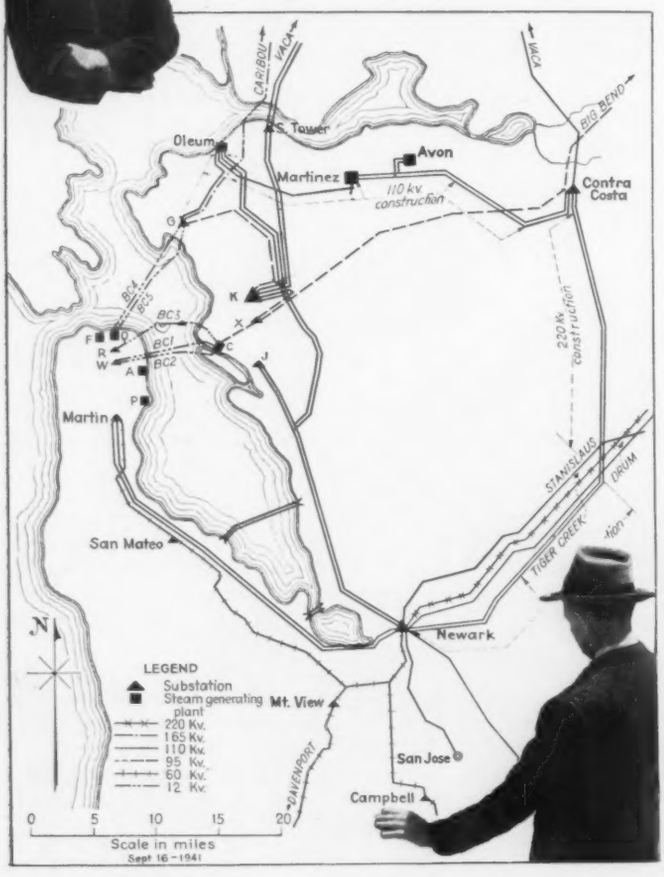
Idea for the generating plants grew out of joint studies conducted back in 1938. The oil companies needed additional steam and power as well as better operating efficiencies. Should they build their own facilities or purchase these services? The investigations favored purchase. Hence contracts were drawn up calling for approximate steam and power supplies for the three refineries as follows: 20,000 kw. maximum power demand; 120,000,000 kw.-hr. per year and 875,000 lb. of steam per hr.

The generating plants — located at Avon to serve Associated (pictured on the front cover), Martinez to serve Shell (shown above) and Oleum to serve Union—feature a number of innovations, including semi-outdoor construction, two distinct steam operating cycles, earthquake resistant construction, ability to burn multiple fuels, either singly or in combination, flexibility in design and turbines equipped with a combination of speed and automatic extraction governing. The installations were initially designed to be almost identical 40,000-kw. stations so as to reduce engineering, construction and operating costs to a minimum. The only differences were minor—circulating water supply, foundations and switchyard layout. However, power demands necessitated the addition of a second unit at Oleum. Cost exclusive of transmission facilities is approximately $20,000,000.





LAYOUT of the stations is unconventional (this pictorial trip will be confined to Avon with occasional notes as to essential differences between stations). Much of the equipment is outdoors, including boilers, evaporators, fans, water softening equipment and contact and deaerating heaters. By locating the hot-air duct between the air heaters and the boilers along the burner fronts, a roof was provided for the firing aisle. By roofing over corresponding space between boilers the aisle was enclosed. Three boilers (above, left) furnish steam to the turbine and the evaporators. The pitch used for fuel must be heated before it can be burned. Fuel heaters are at right of the boilers.

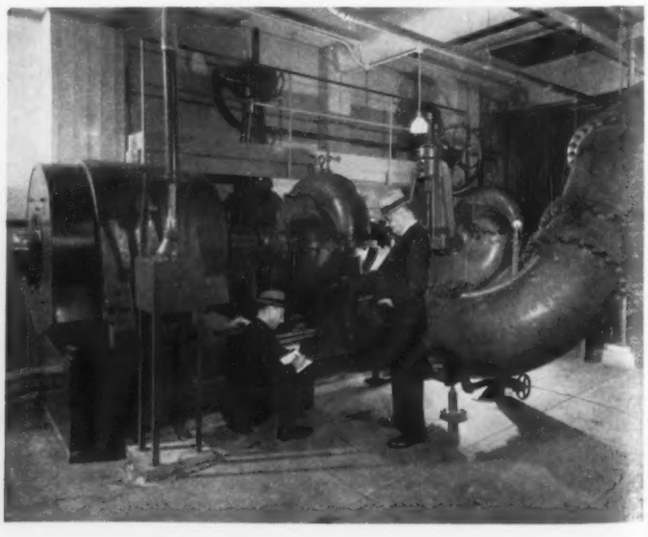


MULTI-FUEL burners—three to a boiler (in the picture above the third does not show)—permit use of several fuels, ranging from acid sludge, pitch and powdered petroleum coke to natural gas and fuel oil, to be burned singly or in combinations. With some of the waste fuels it is necessary to burn a little gas to maintain good combustion.

A SINGLE combined forced- and induced-draft fan (above, right) with both impellers on the same shaft serves each boiler. Each fan is driven by either of two motors mounted on opposite ends of the shaft. One is a 400-hp., 2,400-volt, 900-rpm. motor, the other a 1,000-hp., 1,200 rpm. machine. Vanes vary the air quantity delivered.

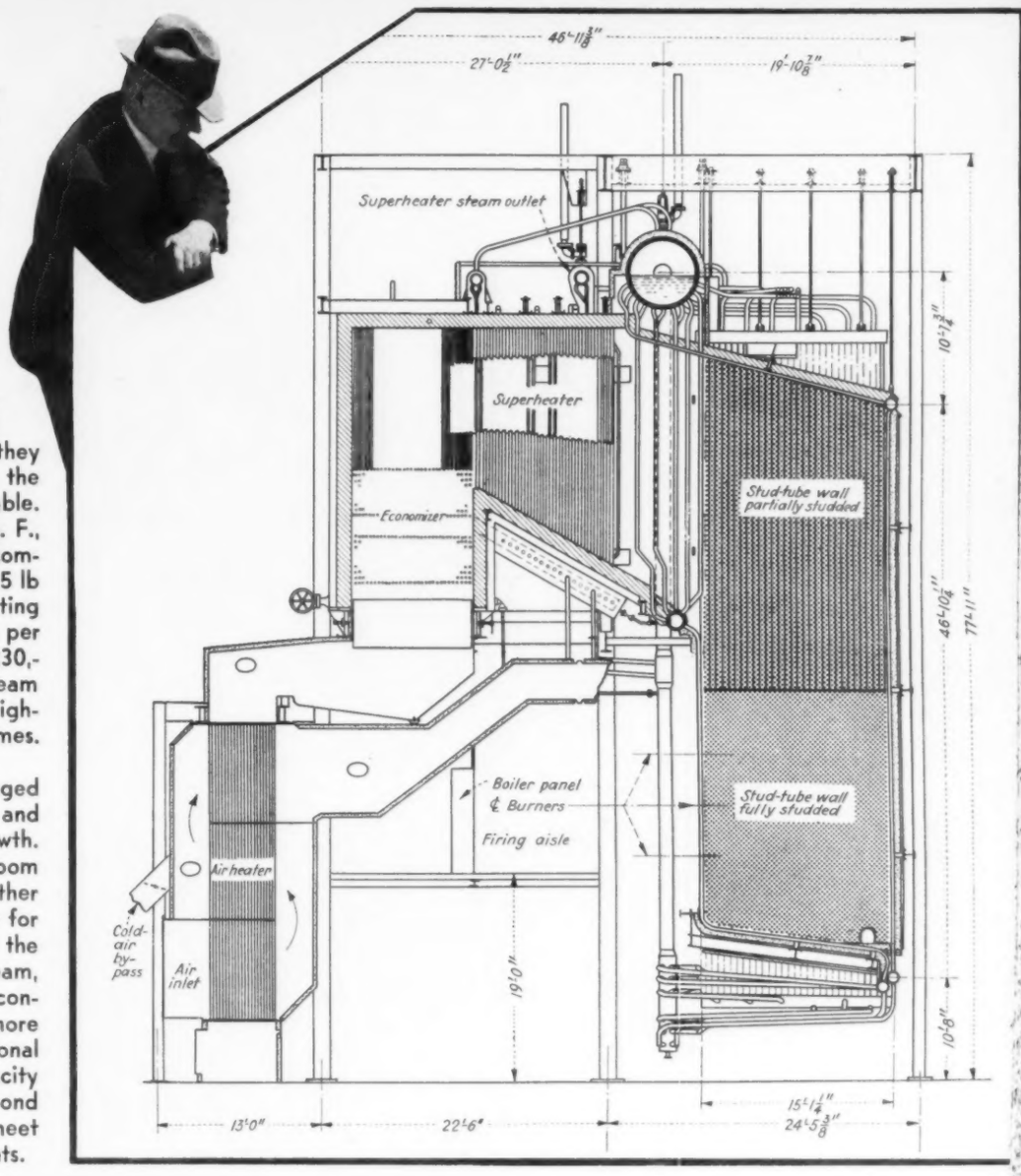
AS SHOWN in the map (left) the three plants are located close to the load center of the Pacific system. New 110-kv. lines were required to tie Martinez and Avon to Contra Costa substation. One unit at Oleum will feed into the Claremont-Newark 110-kv. line at Orinda switching station. The second unit will feed into the Martinez plant over one 110-kv. line and into Station "X" over another.

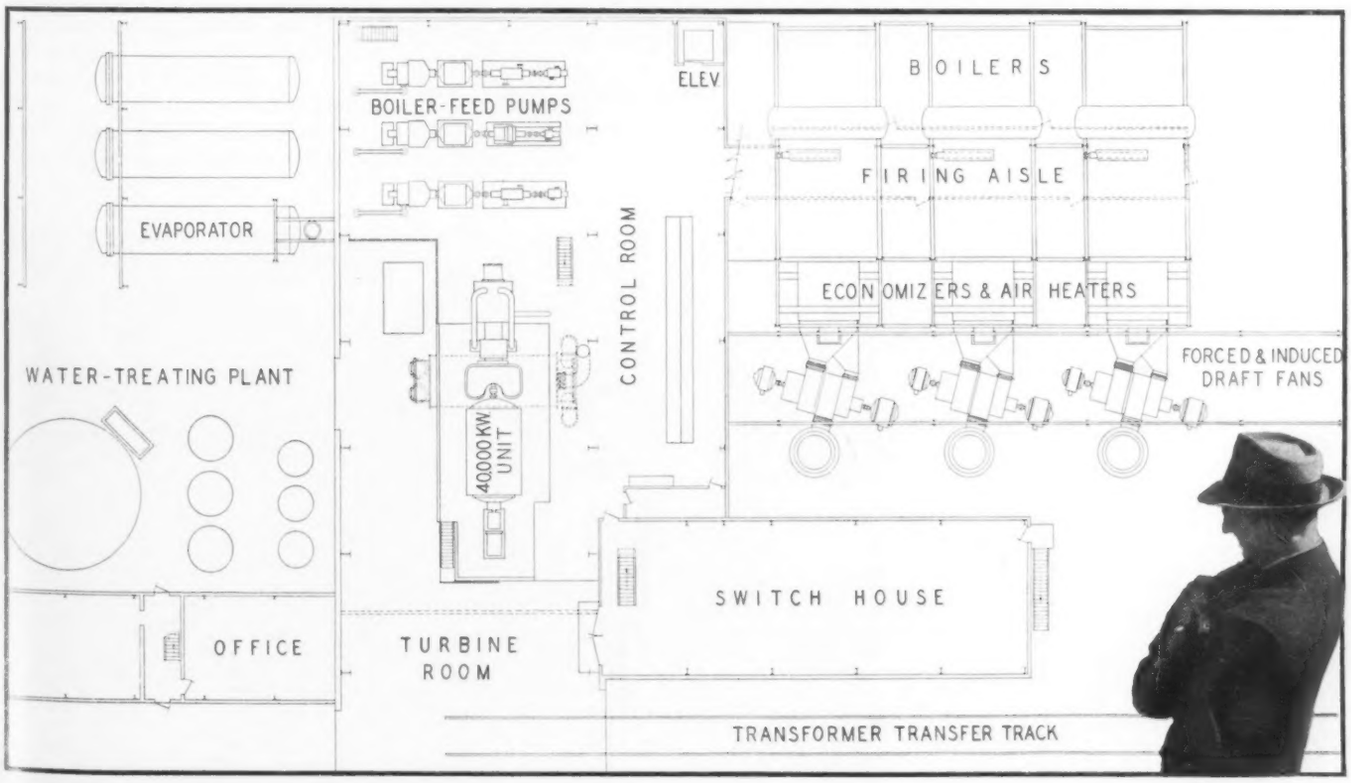
EACH unit has two circulating water pumps driven by a 400-hp., 2,300-volt motor (below). Incidentally there are upwards of 5,000 valves in the piping in each station, ranging in size from $\frac{1}{8}$ to 36 in., each with its own number.

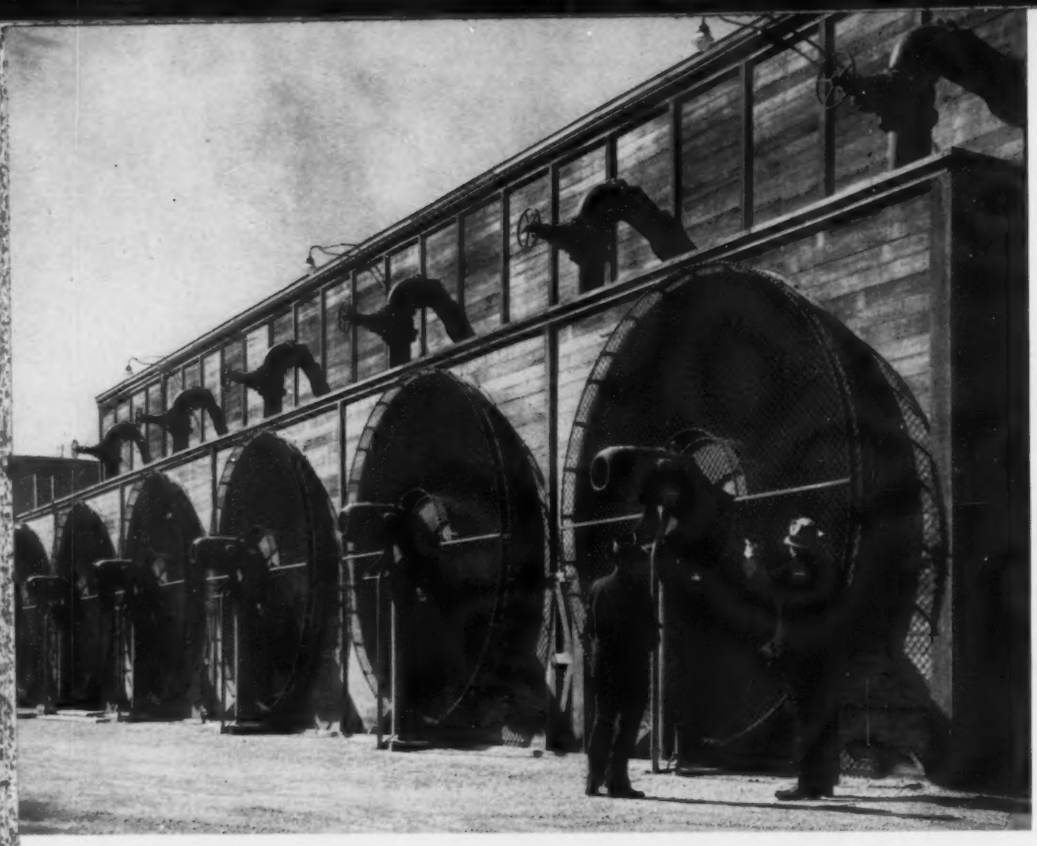


BOILERS of the "radiant" type reflect the most recent progress in design. They get the "radiant" designation because most of the boiling or addition of latent heat is accomplished by the radiation of heat to the furnace walls. There is very little conventional boiler convection bank. Of the various types of units available, the radiant boiler satisfactorily and economically met the requirements in steam output, steam pressure, total steam temperature and superheat control. At the same time they were admirably suited to handle the multiplicity of fuels that were available. Total steam temperature is 950 deg. F., which is among the highest used in commercial practice, and pressure is 1,525 lb per sq. in. The normal continuous rating of each boiler is 200,000 lb. steam per hour, with an overload capacity of 230,000 lb. Cyclone separators and steam scrubbers assure steam of the highest quality and purity at all times.

EQUIPMENT in the plants is arranged for the most flexible operation and to take care of any future load growth. Turbine, switchhouse and control room are housed in a brick building. All other equipment is outside. Design allows for any possible future eventuality. If the refinery no longer should need steam, the plants could be operated full condensing. On the other hand, if more steam should be required, additional boiler, turbine and evaporator capacity can be installed. At Oleum a second 40,000-kw. unit is being added to meet increased system power requirements.

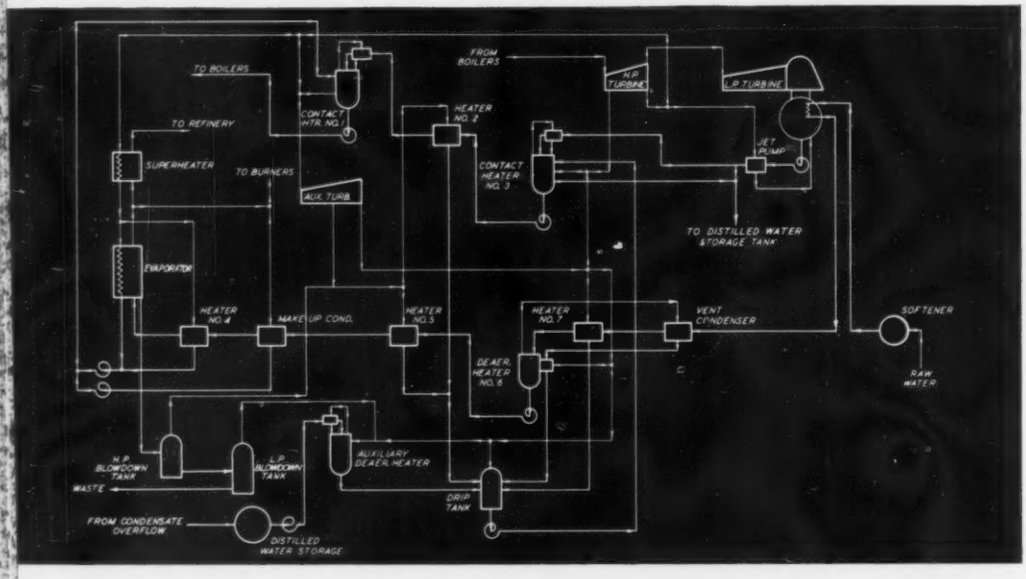






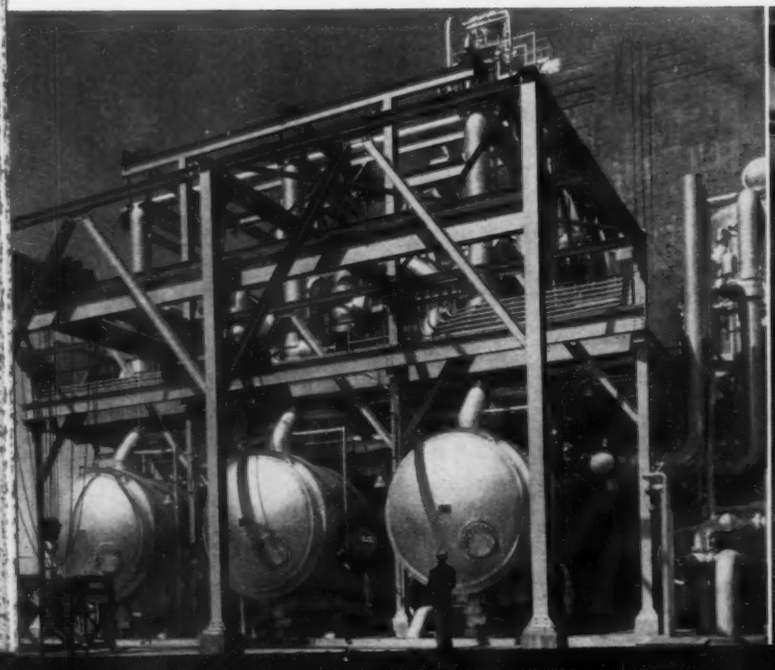
AT BOTH Avon and Martinez cooling is accomplished with water that passes through forced-draft cooling towers. Twelve cells make up each unit.

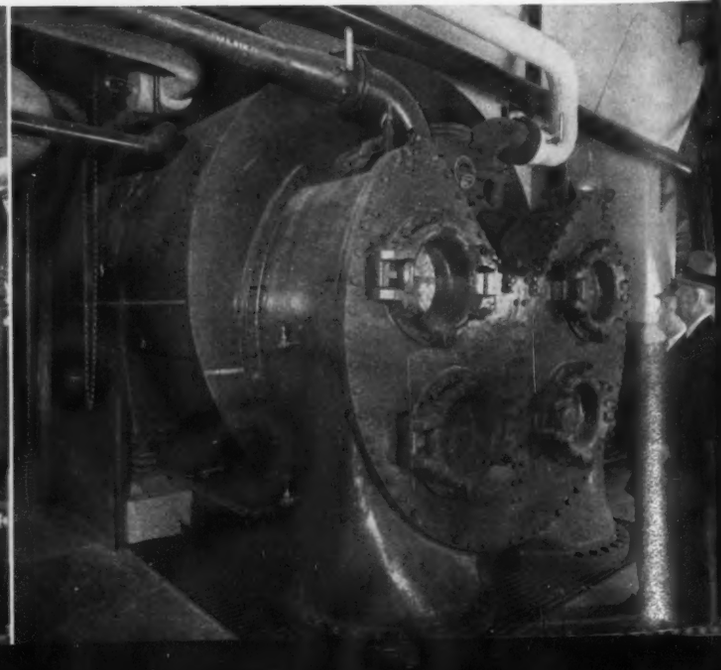
ONE of the features of the plants is the heat cycle. There are two distinct steam-operating cycles: (1) A complete cycle for the generation of electric power in which steam is generated and delivered to the main turbo-generator, condensed and the condensate pumped back to the boilers through a closed system of feedwater heaters; (2) the evaporation cycle in which the process steam for the refinery is generated from water supplied by the refinery. In this cycle steam exhausted from the high pressure turbine is passed through the evaporators where heat is exchanged through coils of copper tubing to the refinery water, thus producing process steam. This is delivered to the refinery for use at 160 lb. per sq. in. pressure and 50 deg. F. superheat.

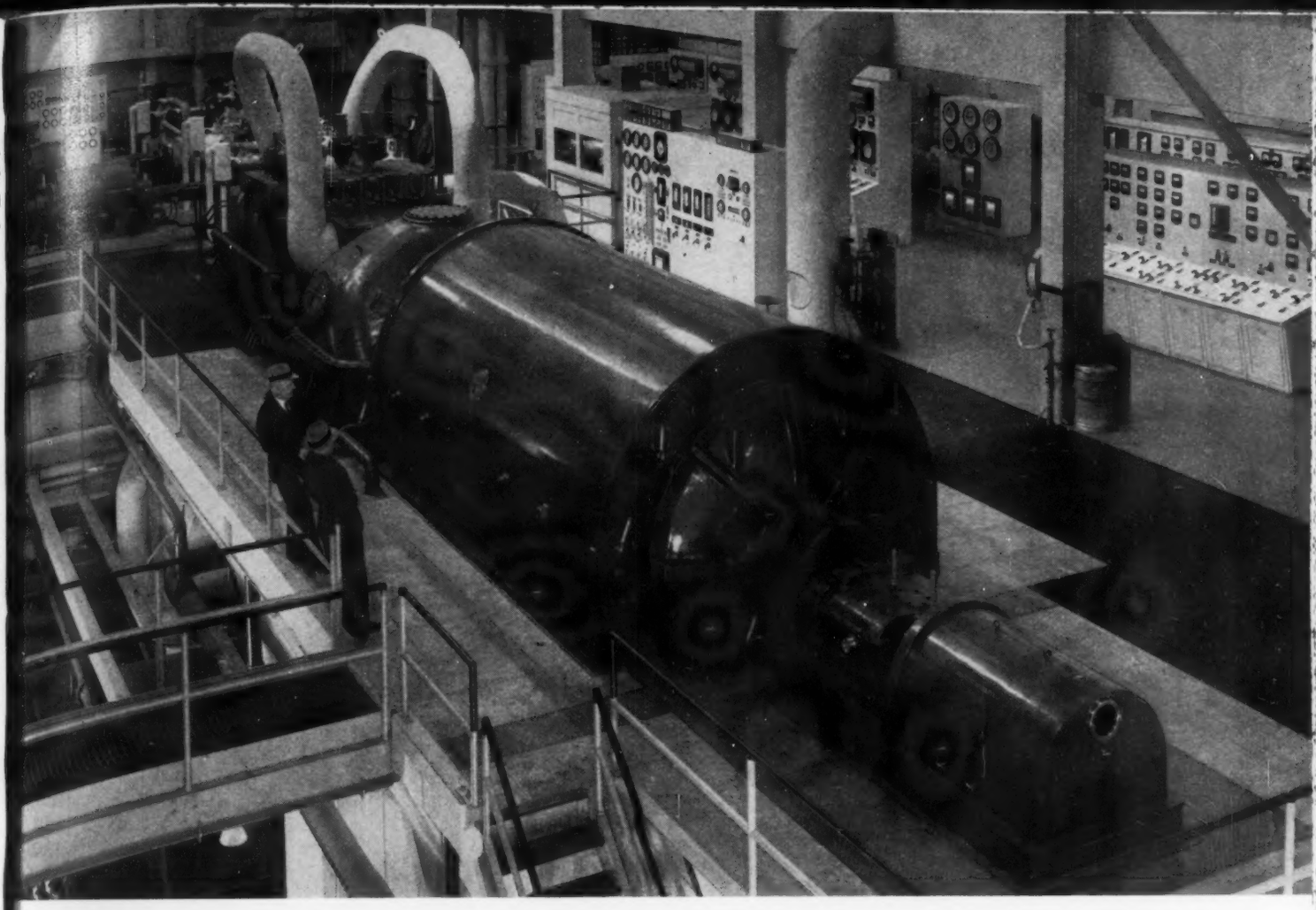


AT AVON and Oleum three evaporators (below, left) are installed, while at Martinez there are four. They are of the coil type with welded steel shells 9 ft. in diameter by 40 ft. long. Tubes are made of arsenical copper. Each evaporator will produce 102,000 lb. of steam per hour for the refinery from 7,500 sq. ft. of heating surface.

CONDENSERS (below, right) have been designed to condense 300,000 lb. of steam per hour with a heat surrender of 280 million Btu. per hour. Water flow is single pass and the water boxes and covers are divided so that half the tubes may be cleaned while the other half are in service. Inside the condenser shell is a four-pass heater that functions to heat evaporator feedwater when the main turbine is operating on standby service.







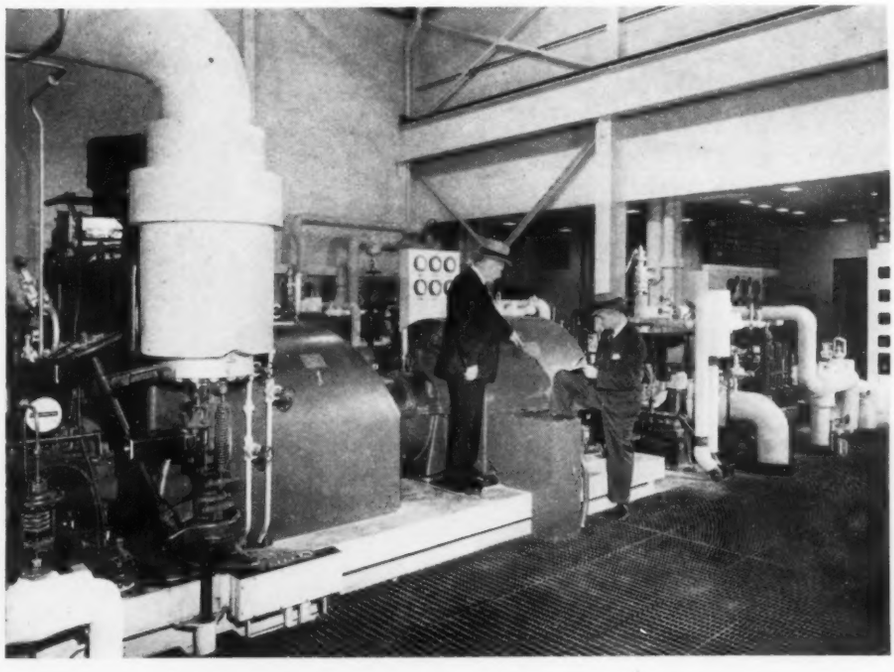
NEW to the PG and E system are the tandem-compound steam turbines. Each unit consists of a combination of a high-pressure non-condensing 3,600-rpm. turbine coupled to a single-flow, low-pressure condensing 3,600 rpm. machine. The high-pressure section is designed for a maximum flow of 675,000 lb. per hr. with a back pressure of 225 lb. Under these conditions output is approximately 32,500 kw. The low-pressure machine is the manufacturer's basic 20,000-kw. unit. The compound unit will carry upwards of 50,000 kw. under certain conditions if load demands require it. Operation of the turbines has been worked out to permit controlling the low- and high-pressure units as though they were separate machines by combined speed and automatic extraction governing.

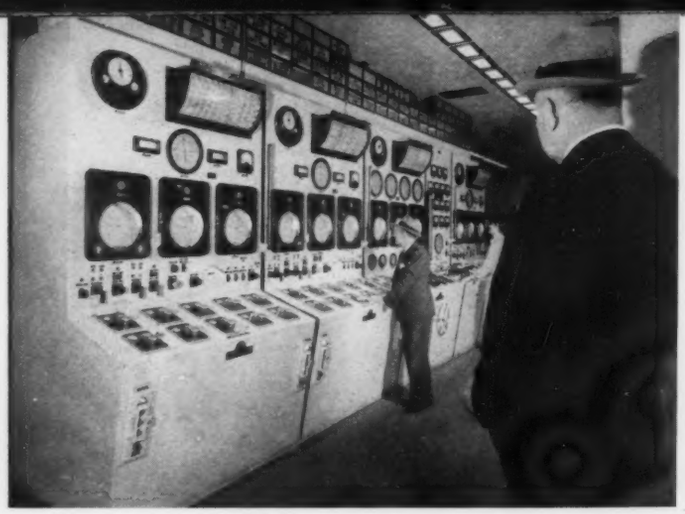
Generators are rated at 40,000 kw., 0.8 p.f., 50,000 kva., 3,600 rpm. 12,000 volts, 3 phase, 60 cycles. They are hydrogen cooled. Shaft and pilot exciters are connected through a reduction gear and are driven at 1,800 rpm. The shaft exciter is rated 175 kw. at 250 volts d-c; the pilot 4 kw. at 250 volts. A fan at each end of the generator rotor circulates the hydrogen, and water coils in the gas compartment remove the heat.

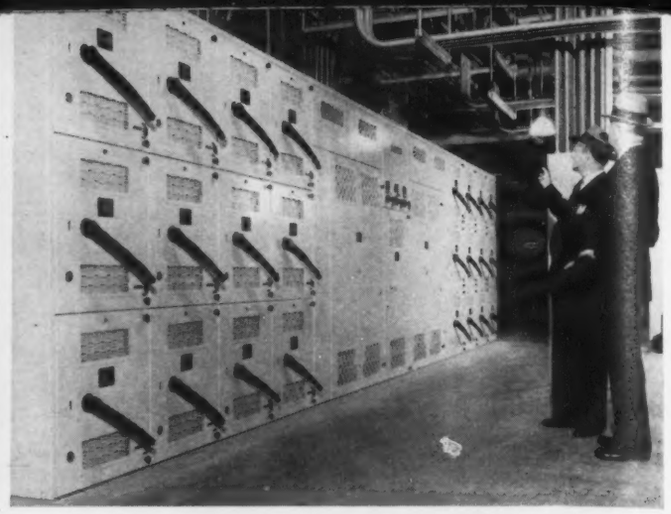
THREE dual-drive boiler feed pumps (below) are installed in each station. Drive consists of a 1,625-kw. turbine and a 1,340-hp., 2,300-volt induction motor that may be used as an auxiliary power supply, since the motor is arranged to be driven above synchronous speed by the turbine. Under those conditions the motor operates as an auxiliary 1,000-kw. induction generator.

SUPPLIERS OF MAJOR EQUIPMENT

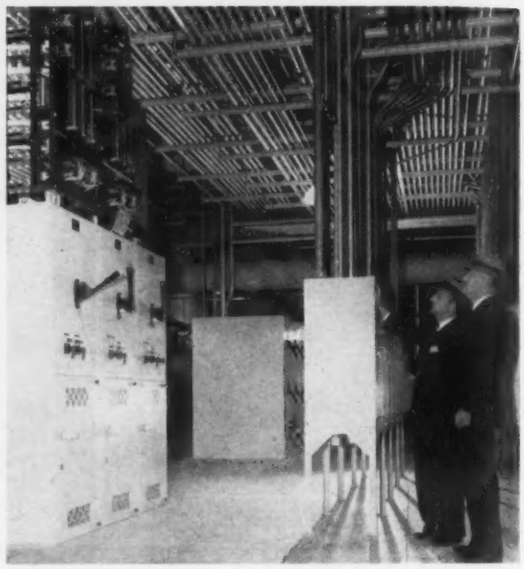
EQUIPMENT	MANUFACTURER
Boilers	Babcock & Wilcox
Turbines	General Electric
Condensers	Ingersoll-Rand and Worthington
Boiler feed pumps	Ingersoll-Rand and Worthington
Evaporators	Foster Wheeler
Cooling tower	Foster Wheeler
Boiler fans	Sturtevant
Stacks	Western Pipe & Steel
110-kv. oil circuit breakers	Pacific Electric Mfg. Co.
110-kv. transformers	Westinghouse
12-kv. metal-clad switchgear	General Electric
2,300-volt metal-clad switchgear	Westinghouse
240-volt, two-phase, metal-clad switchgear	Westinghouse
240-volt, 3-wire, metal-clad switchgear	I-T-E

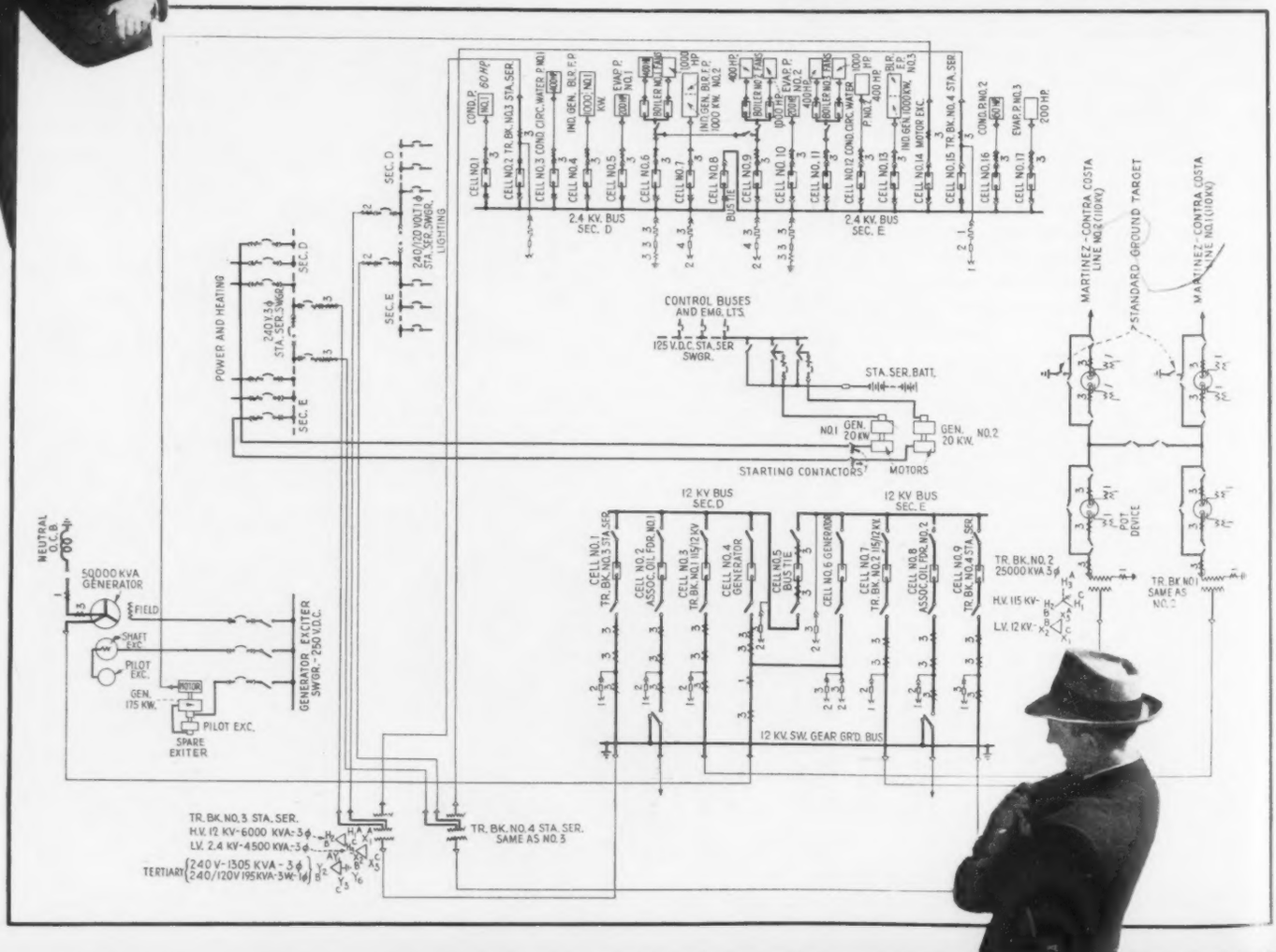


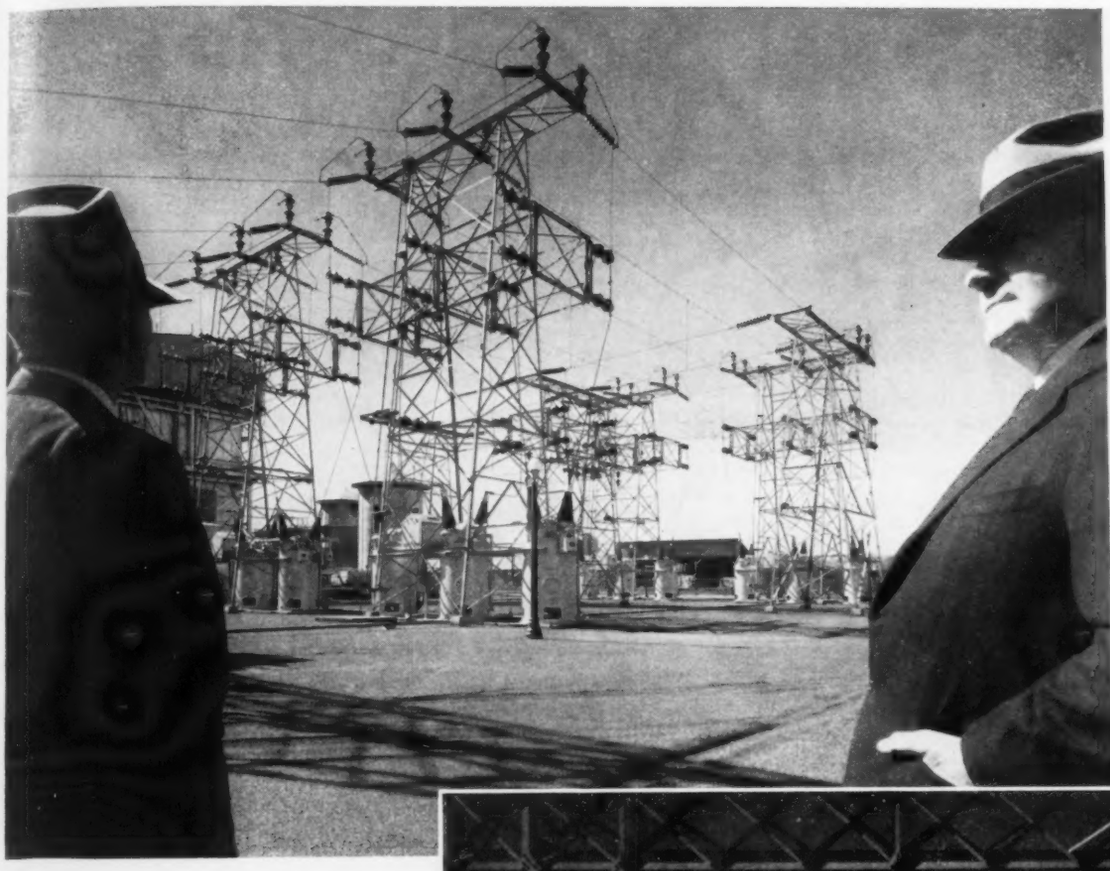


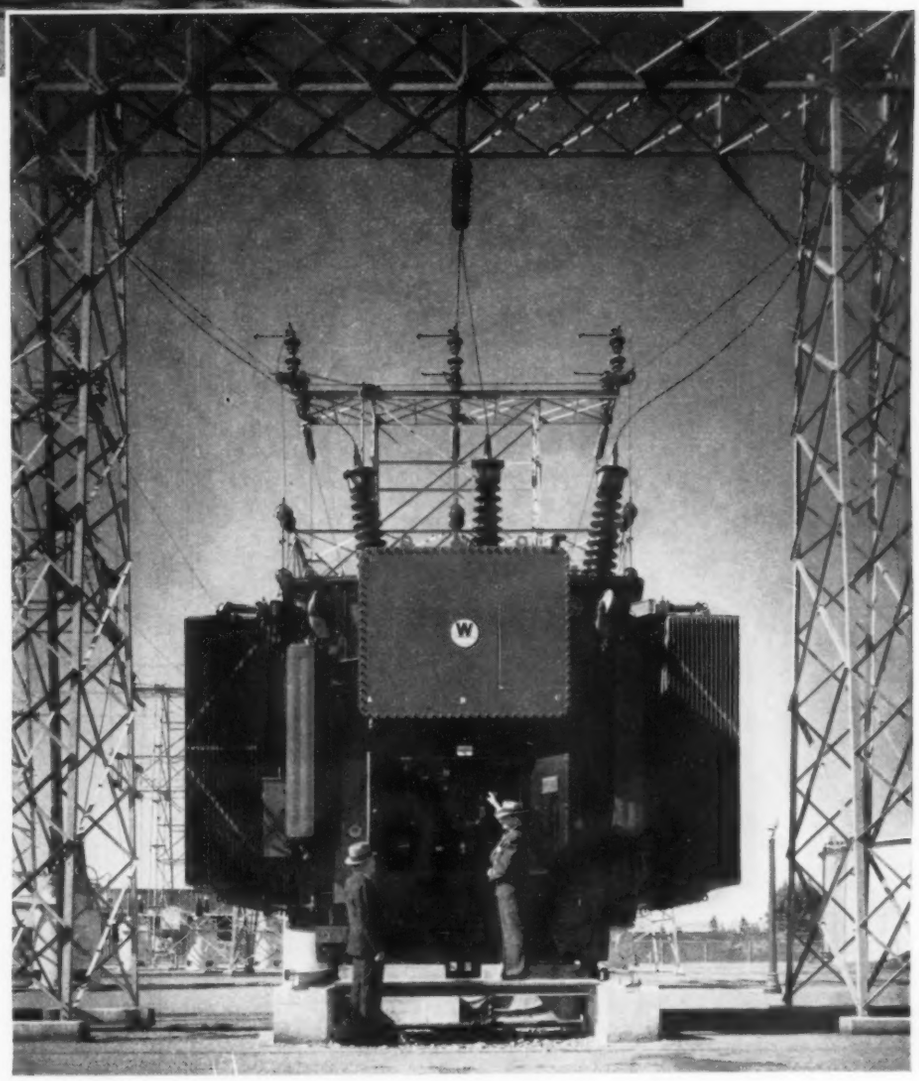


ALL switchgear is metalclad. Typical is the 240-volt, 3-phase panel pictured above (right). Thermal circuit breakers having a 10,000-amp interrupting duty are used in this instance. Many of the sub-switching panels have dual power supply. Control of the entire station is automatic insofar as possible, and is centralized in the control room. Pictured above (left) are the boiler and generator benchboards. Switchboards are steel panel type, totally enclosed with semi-flush mounted instruments, meters and relays. Panels are cream colored and instrument flanges are black, providing excellent contrast. Panels and benchboards carry more instruments than a long range bomber. Thinwall galvanized iron conduit with threadless fitting was used inside the stations. Conduit runs were exposed and supported on racks hung from the ceiling as shown in the view of the exciter panel to the right. Generator output is fed directly into a single 12-kv. bus divided into two sections by a 2,000-amp. sectionalizing oil switch. Connected to each section is a 12-kv. feeder to the refinery transformers, a 6,000-kva. station service transformer and the 25,000-kva. main transformer as shown in the wiring diagram below.




COND. P. NO.1 60 HP
CELL NO.1
CELL NO.2 TR. BK. NO.3 STA. SER.
CELL NO.3 COND. CIRC. WATER P. NO.1
400 HP
CELL NO.4
IND. GEN. BLR. F.P. 1000 KW. NO.1
CELL NO.5
EVAP. P. NO.1 400 HP
CELL NO.6
BOILER NO.1 TUBE
1000 HP
CELL NO.7
IND. GEN. BLR. F.P. 1000 KW. NO.2
CELL NO.8
400 HP
BOILER NO.2 TUBE
1000 HP
EVAP. P. NO.2 400 HP
CELL NO.10
BOILER NO.3 TUBE
1000 HP
CELL NO.11
CELL NO.12 COND. CIRC. WATER P. NO.2 400 HP
CELL NO.13
BLR. F.P. 1000 KW. NO.3
CELL NO.14
IND. GEN. 1000 KW. NO.3 MOTOR EXC.
CELL NO.15 TR. BK. NO.4 STA. SER.
CELL NO.16
COND. P. NO.2 60 HP
CELL NO.17
EVAP. P. NO.3 200 HP
2.4 KV. BUS SEC. D
2.4 KV. BUS SEC. E
BUS TIE
SEC. D
SEC. E
240/120 VOLT 1φ STA. SER. SWGR. LIGHTING
POWER AND HEATING
240 V 3φ STA. SER. SWGR.
CONTROL BUSES AND EMG. LTS.
125 V.D.C. STA. SER SWGR.
STA. SER. BATT.
GEN. NO.1 20 KW.
GEN. NO.2 20 KW.
STARTING CONTACTORS
MOTORS
MARTINEZ - CONTRA COSTA LINE NO.2 (110 KV.)
STANDARD GROUND TARGET
MARTINEZ - CONTRA COSTA LINE NO.1 (110 KV.)
POT DEVICE
NEUTRAL O.C.B.
50000 KVA GENERATOR
FIELD
SHAFT EXC.
PILOT EXC.
GEN. 175 KW.
MOTOR
PILOT EXC.
SPARE EXITER
GENERATOR EXCITER SWGR. 250 V.D.C.
12 KV BUS SEC. D
12 KV BUS SEC. E
CELL NO.1 TR. BK. NO.3 STA. SER.
CELL NO.2 ASSOC. OIL FOR NO.1
CELL NO.3 TR. BK. NO.1 115/12 KV.
CELL NO.4 GENERATOR
CELL NO.5 BUS TIE
CELL NO.6 GENERATOR
CELL NO.7 TR. BK. NO.2 115/12 KV.
CELL NO.8 ASSOC. OIL FOR NO.2
CELL NO.9 TR. BK. NO.4 STA. SER.
12 KV. SW. GEAR GR'D. BUS
TR. BK. NO.2 25000 KVA 3φ
H.V. 115 KV.
L.V. 12 KV.
TR. BK. NO.1 SAME AS NO.2
TR. BK. NO.3 STA. SER.
H.V. 12 KV - 6000 KVA - 3φ
L.V. 2.4 KV - 4500 KVA - 3φ
TERTIARY (240 V - 1305 KVA - 3φ / 240/120 V 195 KVA - 3W - 1φ)
TR. BK. NO.4 STA. SER. SAME AS NO.3





THERE are two outgoing 110-kv. circuits from each station. The oil circuit breakers (above) are rated 115 kv., 600 amp., 1,000,000-kva. interrupting duty. Inside the breaker bushings there is a capacitor which serves as a potential device to supply proper voltage for synchronizing.

TRANSFORMER equipment consists of two 115-kv., 25,000-kva., 3-phase self-cooled units for each generator. They have nitrogen gas-cushioning equipment to prevent oil sludging, and remote-controlled load-ratio control having a range of eight percent down from 115 kv. These are the largest 3-phase transformers on the Pacific system. Usually four single-phase units are installed, using one as a spare. Because continuity of power on the 110-kv. bus was an important factor, the 3-phase transformers were selected. If one line trips out due to a fault, the station can still supply 25,000 kva. over the second line without interruption. An overlapping system of relay circuits is used so that there are no unprotected zones.

THE STATIONS were designed by the company's engineering department and were constructed by contractors under the supervision of the company's construction department.

Operating Despite Air Raids and Bombs

A London utility executive answers a series of questions on various phases of utility operations under wartime conditions in England

By Harry Towers
General Manager, Edmundsons Electricity Corp., Ltd.
London

In a letter to

Davis M. DeBard
Vice-President, Stone & Webster Service Corp.

BECAUSE of frequent trips to the British Isles, Davis DeBard has many friends in various branches of the electrical business there. Ever since the war started he has kept up correspondence with them. Some of the letters he receives give a clear insight into electrical conditions. In this letter the writer answers ten questions relating to utility operations. The company managed by the writer of this letter serves 400,000 electric customers in various towns in southern England and around London. The questions and their answers follow.—*The Editors.*

1. Q. How extensively are women being used by electric utilities in work formerly done by men? (a) What kinds of jobs? (b) What problems involved? (c) How well is work done in comparison with men?

A. On the practical side of electric utilities in this country women have not been engaged to any extent so far. There are, however, a number of undertakings using women as meter readers and we understand they are doing this work satisfactorily.

In one power station, women have been engaged on plant repairs and maintenance, cleaning, etc. It is considered that in the near future probably another dozen women will be employed on repairs and maintenance work, on such jobs as boiler cap cleaning and upon chain grate assembly work. It is further envisaged to use women on such work as the driving of small trucks and for stores and laboratory work. Other stations are following suit.

Accommodation for female labor in this power station has occasioned some slight re-arrangements, but in no case has this presented any difficulty. Appropriate female welfare supervision is requisite.

It is very difficult to generalize on how well work is done by women in comparison with men, as conditions in this country since the outbreak of war have been so abnormal that comparison is almost impossible. The manner in which young girls and women have carried on their work under the most trying conditions of aerial bombardment has won widespread admiration.

2. Q. Are utility employees exempted from air warden or home guard or assistant fireman duties? Under what conditions?

A. Utility employees are not exempt from Air Raid Wardens, Home Guard, Nursing, Auxiliary Fire and Fire Watching services as they are all voluntary. In fact almost without exception all fit employees are members of one or other of the Civil Defence Services and do a spell of duty in addition to their normal everyday work for which no pay is received, though those on fire watching generally get a grant of a few shillings per night with which to buy supper and breakfast.

3. Q. To what extent have non-technical employees been trained to do emergency work?

A. Very little training of non-technical employees has been done to equip these people for emergency work, for the reason that practically every individual has been trained for some voluntary work as fire watching, auxiliary fire fighting, first aid, Home Guard or part-time air raid wardens. Furthermore, in accordance with a schedule of reserved occupations, technical employees of utilities are, in certain cases, exempt from military service in certain age groups, thus retaining for essential services technical employees. In other words pretty nearly everyone's time outside their normal work is taken up with some form of national service, for which they have to be trained.

4. Q. What electrical operating problems are involved in blackouts?

A. In order to comply with the regulations, all openings in buildings have to be very adequately screened so that no light shows. In most power stations this, coupled with the desire to prevent flying glass due to blast, has meant that most windows have been bricked up for the war period and roof window lights screened by wooden structures.

Such places as power stations and attended substations have in addition to ordinary lighting a system of what may be termed "pilot" lighting of low intensity located at important points, such as switchboard instruments, turbine controls, etc. Thus, should part of the outside wall of the building be damaged by enemy action and lights exposed, the main lights could be switched off and the pilot lights brought into action, with the result that the operators may continue with their work and no confusion is caused by the building being suddenly plunged into darkness.

5. Q. Are portable generating stations or substations being used to any extent for emergency service?

A. No great use has been made of the portable generating and substation equipment, although adequate stocks of transformers, switchgear, etc., are always available to readily replace equipment that may be damaged. So far as the electricity grid is concerned, the Central Electricity Board, through the various utilities, has arranged for major pieces of equipment to be available at a large number of points throughout the country to replace any which may be damaged due to enemy action.

The effects of damage, though in some cases serious, have not been such as could be overcome by the use of mobile equipment, but the spares referred to have been readily available to get back into use quickly anything destroyed or damaged.

6. Q. What new devices have been developed (a) for use by utilities on their systems; (b) for use by consumers?

A. Very few new devices have been developed for use by utilities on their systems as a direct result of the war. So far as devices developed for use by industrial consumers are concerned, there are obviously a number which have come into being but are of such a secret nature that we are not familiar with them. The only new development of importance for use by utilities in their system has been high voltage air blast switchgear. The reasons for this development are (1) Considerable economy in valuable material. (2) Reduction in fire risk owing to the absence of oil. The general opinion in this country is that this gear has considerable advantages over oil switchgear

We ourselves are installing a large switching site outdoors with air blast breakers, 66 kv. and 1,500,000-kva. rupture capacity.

Up to date this gear has been developed for 11 kv., 33 kv. and 66 kv. and steps are being taken to develop it for 132 kv.

So far as devices for use on consumers' premises are concerned, a number of appliances have been developed to meet the requirements of people who normally use gas for cooking and heating, and are unable to do so due to failure of supply. It has been the general experience that where a town has suffered from enemy action, the electricity services have stood up much better than gas, in that the former were in a position to make temporary repairs much more expeditiously and thereby maintain an almost uninterrupted supply.

Most of these appliances are inexpensive and of such type that we would not recommend them for permanent use. They mostly consist of combination boiling plates and fires (heaters).

Generally it is fair to state that the exigencies of war and enemy action, at any rate electrically speaking, have not made it necessary to depart from standard equipment and devices, material generally in use having—on the whole—been found sufficiently useable and adaptable under war conditions.

7. Q. Have any restrictions been put on the use of electricity or any removed?

A. No restrictions have been put on the use of electricity or been removed. During the first winter of the war a method of rationing electricity and gas was evolved, but was not put into operation as the consensus of opinion was that it would be so cumbersome as to be almost impracticable, and no means has yet been devised of cutting off say the domestic supplies between certain hours without interfering with the loads for war factories and essential and semi-essential work. At the moment there is absolute freedom to use as much electricity as is desired both industrially and domestically.

8. Q. What changes has the war brought with respect to (a) record keeping; (b) frequency of billing; (c) rates; (d) inspection; (e) overhaul, and (f) regulation?

A. (a) All essential and important documents have been duplicated and photographed and sent to a safe place for storage. In other words records are located at different points throughout the country to keep them as widespread as possible.

(b) No change has been made in billing periods, mostly on quarterly basis.

(c) Generally, increases have been made in 198 local municipal authorities, which is about 53% and in the case of private companies 59 which is approximately 27%, so that out of the total electricity undertakings 43% have increased tariffs since the outbreak of the war in September, 1939. The different companies making up Edmundson Group have not increased tariffs at all.

(d) Routine inspection and overhaul are carried out, as far as possible in accordance with peacetime practice, but due to the war we have stopped routine overhaul of meters, except in some of our areas where there are meters of a bad type. Generally speaking, however, the strain put on all plant and equipment working at war pressure is such that an equivalent amount of time has to be put in on inspection.

(e) The opportunities for overhaul, especially of boiler plant, have been reduced, and for that reason considerable attention is being given to the question of boiler availability, which, until very recently, has not compared favorably with American results. For this reason many of the new plants that are being installed are pulverized fuel fired, the unit system with ample mill capacity being employed in every case. High availability is made considerably more difficult to obtain owing to the very high number of poor quality fuels which it is necessary to burn.

(f) We have the same government regulations as pre-war, plus goodness knows how many others, dealing with this, that and the other requirement of government departments. It is fair to say that considerably more time has now to be devoted to making returns, filling in forms and generally providing information of use to government and service departments purely for purposes of conducting the war. Many people in this country, of course, think we have far too much regulation and much could be cut off.

9. Q. Are increased taxes absorbed by power companies or passed on? If the latter, how?

A. This varies in different undertakinigs. Taxes as such have not been considered separately, but increased costs as a whole have been passed on in the way of increased tariffs, unless the undertaking was in such a position that it could absorb them due to increased revenue from general development of business caused by increased industrial and/or domestic load due to evacuation. There was a statement by the Chancellor of the Exchequer some months ago that he proposed to "peg" the price of electricity to prevent further increases in the cost of living. This in turn depends on a lot of other things being "pegged" as to price. For instance, coal, wages, transport, and so on, and though the statement was made it has not been followed up by any action due, one supposes, to the inherent difficulties of "pegging" all other items which tend to make up the cost of electricity.

10. Q. Have there been many cases of sabotage?

A. We have had no cases of sabotage anywhere in our group and so far as we can ascertain from inquiry elsewhere there have been no cases of real or suspected sabotage in connection with the supply industry.

Acme Newspictures, Inc.

Host to the AIEE Pacific Coast convention was the Montana Section. Here are (left to right) E. W. Schilling, Montana State College, section chairman; D. C. Prince, General Electric Co., AIEE national president; W. F. Reif, Montana Power Co., general convention chairman; and H. E. Murdock, Montana Power Co., section secretary

AIEE Meet Studies Future

Engineering problems of post-emergency period objectively viewed by Pacific Coast conclave

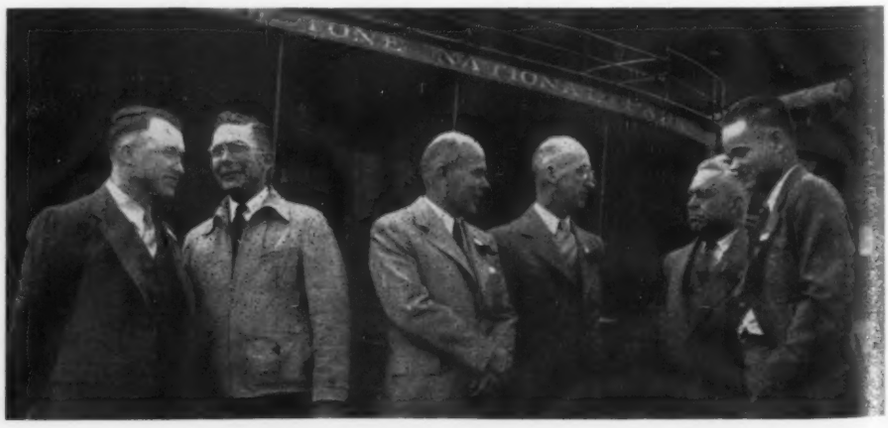
IN SESSIONS characterized by the excellence of the programs and the seriousness of the discussions, 321 members and guests at the annual Pacific Coast convention of the AIEE at Yellowstone National Park Aug. 27-29, studied objectively some of the engineering problems that are likely to follow the present emergency.

One session centered attention on the subject "After the Emergency What?" In a paper on this article, D. C. Prince (General Electric Co.) AIEE president, pointed out that the highest standard of living will be obtained only by giving people work and if private industry is to accomplish this it will have to make and carry out the right plans. These plans will not be in the form of dictation from central authority such as in Germany, Italy and Russia, he said, but will rather represent the planning of local groups who will solve local problems. When it is found that a problem involves more than a local group, it will have to be solved by the people concerned, which is the essence of American democratic process. The thought was expressed that engineers are in a strategic position because they are trained in planning that involves accurate calculations of labor, material and all the other elements of the problem, which, carried to its logical conclusion, is the same kind of planning that is done by them in building a great hydro-electric project. Of course a great many people other than engineers will have to do their part, but it is President Prince's belief that the leaders of labor, industry, business, agriculture and banking can and will work together to produce the highest standard of living that this country has ever known. Much discussion followed this paper with various ideas being expressed as to ways and means of proceeding, but the over-all group opinion was fully in accord with the necessity of properly planning for post-war conditions.

At another session devoted to protective devices some new and up-to-date performance data for line-type lightning arresters rated 20 to 73 kv. were presented by a special committee. Two new devices were described to provide greater reliability for distribution circuits. A. E. Brook (Pacific Electric, San Francisco) discussed a new automatic service restorer featuring high current adjustments and a means of storing operating energy through a low-speed vibrator motor and torsional spring, which assures an infinite number of intermittent operations. A low maintenance cost, small, automatically-reclosing self-protected oil circuit breaker for extended distribution circuits was described by H. L. Rawlins and J. M. Wallace (Westinghouse). The new device is aimed at eliminating service trips on temporary faults and at restricting outages to the immediate vicinity of a permanent fault.

Satisfactory British and continental European experience in the use of earth leakage relays for locating single-phase line-to-ground faults on compensated high voltage lines, both overhead and underground, was cited by E. T. B. Gross (College of the City of New York). A standard method of application, test and operation was disclosed. G. W. Dunlap (General Electric) explained a new portable recovery voltage analyzer developed to permit direct and rapid determination of transient recovery voltage characteristics of circuits and interrupting apparatus with actual power tests.

Tests on a high-speed, 138-kv. air-blast circuit breaker cited by Philip Sporn (American Gas & Electric Service Corp.) and H. E. Strang (General Electric) indicate performance of this new form of interrupting device to be at least the equivalent of present forms of conventional oil breakers. Tests were made to prove interrupting ability under field and service conditions and also to determine operating characteristics on super-speed reclosing duty. This new type of breaker is in



Among the 321 members and guests at the AIEE Yellowstone convention were (left to right) W. A. Boyer, Anaconda Copper Mining Co., Butte; C. J. Herman, Mt. States Telephone Co., Helena; Charles S. Rich, AIEE staff, New York; Carl C. Hill, Mt. States Telephone Co., Helena; R. H. Hill, University of Idaho, Moscow; D. K. Brake, Mt. States Telephone Co., Helena

an advance development stage and trial installations are about to be put in service in order to obtain additional field experience. A considerable amount of discussion on this paper indicated an intense interest in this new device.

A report of an investigation made by H. S. Shott and H. A. Peterson (General Electric) of the factors affecting neutral instability of wye-grounded potential transformer circuits revealed that regions of instability sometimes occur when this method is employed to detect ground faults. Conditions under which incorrect fault indications may be obtained were set forth. Another paper in which Peterson collaborated with S. B. Farnham and E. M. Hunter (General Electric) showed how the same miniature system method of representation was used to determine data on modern ground fault neutralizer design and application. It was shown that ground fault neutralizer applications effectively avoid system overvoltage difficulties. Discussion of Shott's paper pointed out that this vast amount of information has been desired for years and it was emphasized that it will now be possible to apply transformers correctly with a minimum of engineering.

A varied program of entertainment built principally around the natural features of Yellowstone was provided for the delegates.

Resuscitation—II

Rest, special care vital to recovery from electric shock

By Charles F. Dalziel
University of California

REST and advice of a physician are essential considerations in connection with the resuscitation of a victim of electric shock through the application of artificial respiration. Since publication of the article, "Resuscitation After Electric Shock," in the April issue of ELECTRICAL WEST, the author has received numerous letters and has spent considerable time discussing the subject with safety engineers, electrical engineers, and physicians. Although the importance of rest and medical care following resuscitation were stressed throughout the paper, it is believed that special emphasis is desirable to impress the importance of these items on the mind of the layman. In general, field experience indicates that most electrical workers are sufficiently informed to attend to the immediate details of rescue and resuscitation. However, it is believed that fatalities have occurred recently because of inadequate follow-up care of the victim.

After a victim of electric shock has been revived by artificial respiration he may become violent. In other cases he may feel apologetic and may desire to return to work immediately in an effort to hush up the matter or minimize its seriousness as much as possible. On the other hand, he may attempt to start in search of a physician, or he may desire to drive himself home. Experience indicates that after a victim revives it may be difficult to keep him quiet. Several accident victims, believing they had completely recovered, returned to work too soon, with death as the penalty.

After the immediate effects of the electric current on the heart, respiratory organs, and brain have worn off, the danger may not be over. It has long been known that electric current passing through vital centers causes shock to the central nervous system. In severe cases this may be responsible for causing death. Death under such circumstances may occur minutes or even hours after the accident and is generally ascribed to heart failure. In severe electrical accidents, or where the current pathway is through vital portions of the body, the victim, although apparently completely recovered, should lie down, keep warm, and rest quietly until a physician arrives. For accidents in which the victim becomes unconscious, where artificial respiration is necessary, or even in apparently minor accidents where the current pathway is through important organs, the patient should rest for at least the remainder of the day or obtain a physician's approval before resuming strenuous work. Recently, several fatalities involving delayed death have been brought to the writer's attention, all of which might have been averted had the victim (who had been successfully resuscitated) remained quiet and rested instead of going back to work with fatal results.

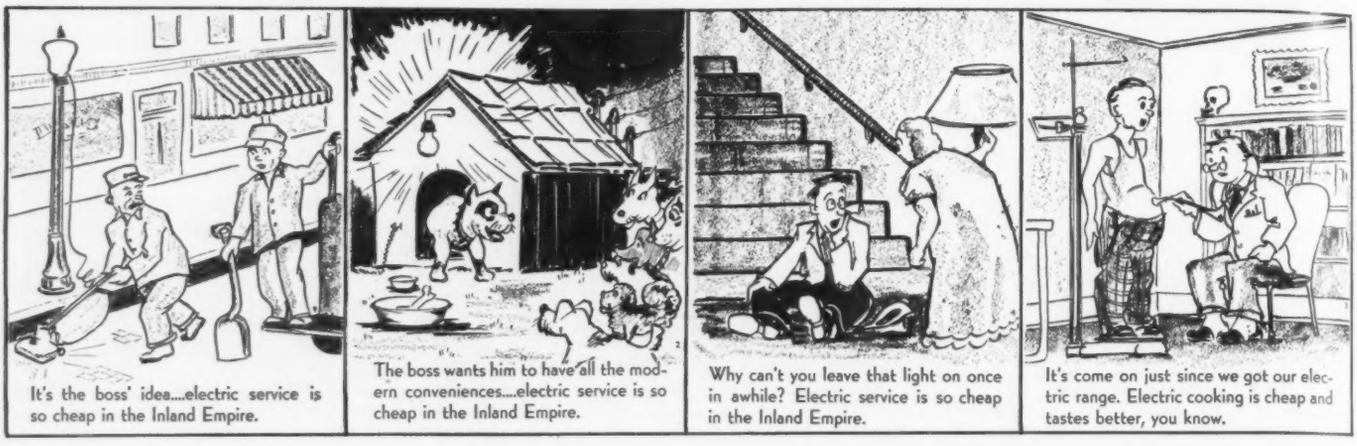
Artificial Respiration

Reread the accepted procedure for giving artificial respiration in cases of electric shock. Make special mental note of all statements concerning the continued care of the victim, such as:

1. When the victim revives, keep him lying down and do not allow him to stand or sit up, or exert himself.
2. Keep the patient quiet and warm.
3. Keep on-lookers and conversationalists away.
4. After the patient revives, give him some stimulant such as hot coffee, tea. a teaspoonful of aromatic spirits of ammonia in a glass of water, etc.
5. Obtain a physician as soon as possible.
6. Keep the patient resting in a comfortable position pending the arrival of medical assistance.
7. Caution the patient against any over-exertion during the first few hours after the shock or until medical advice is obtained.

Training Yard Available For Safety Practice

All line crews at Idaho Power Co. practice safety work in the Boise training yard, shown at right, at least twice a month. Foreman of each line crew conducts two meetings per month and also uses yard at his discretion during safety meetings. Pole top resuscitation is one of most important activities stressed.


It's the boss' idea....electric service is so cheap in the Inland Empire.
The boss wants him to have all the modern conveniences....electric service is so cheap in the Inland Empire.
Why can't you leave that light on once in awhile? Electric service is so cheap in the Inland Empire.
It's come on just since we got our electric range. Electric cooking is cheap and tastes better, you know.

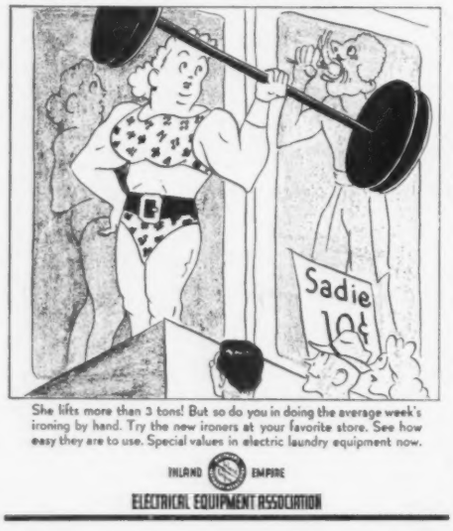
Said with a Smile

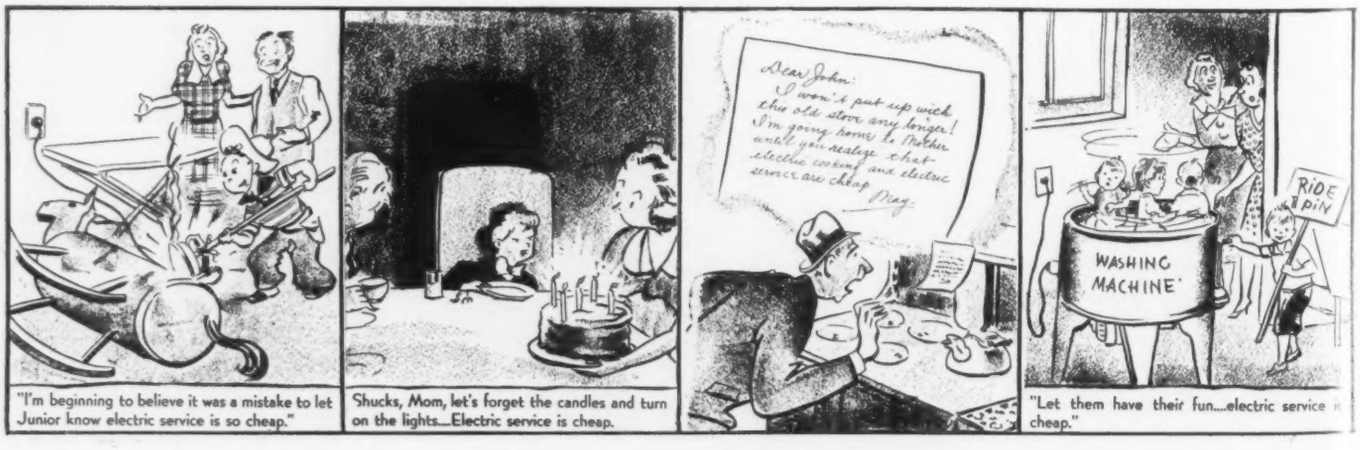
Cartoons tell a sales or institutional story in good humored language understood by all classes

HUMOR has been termed a two-edged sword, sometimes turning on him who uses it. Yet that depends largely on *how* it is used and how gently. Where the aim is an understanding chuckle, a sense of "isn't that the truth," it can be one of the most welcomed means of telling a story.

Such gentle humor has ben used in Washington Water Power Co. advertising with excellent effect. It started in Feb. 1940 as a supplement to major newspaper ads on laundry equipment. "We reasoned that customer readage might be increased," said Kimball Jack, manager of sales promotion and advertising, "in that ads appeared as regular cartoons, 2 col. by 5 in., spaced on the newspaper page. They might possibly attract those readers who are cartoon followers. In addition, through the medium of humor, some sales points could be put across more effectively without offending anyone."

The cartoon, "Sadie of the Circus" was representative of the first group. Comment from the series was so favorable that the same type of ad was used for the lighting season. The cartoon at the right was one of that group. Here again such supplementary advertising called forth favorable comment and so in October and November a series to tell that electric service is cheap was run. It did much to create acceptance of that fact in the Inland Empire. Again it was possible to say in a humorous way what might not be said so effectively in regular display advertising.


SADIE OF THE CIRCUS
Sadie
She lifts more than 3 tons! But so do you in doing the average week's ironing by hand. Try the new ironers at your favorite store. See how easy they are to use. Special values in electric laundry equipment now.
INLAND EMPIRE
ELECTRICAL EQUIPMENT ASSOCIATION


"I'm beginning to believe it was a mistake to let Junior know electric service is so cheap."
Shucks, Mom, let's forget the candles and turn on the lights....Electric service is cheap.
Dear John:
I won't put up with this old stove any longer! I'm going home to Mother until you realize that electric cooking and electric service are cheap.
Mary
RIDE 1 PIN
WASHING MACHINE
"Let them have their fun....electric service is cheap."

A Hundred Displays a Month

Animation stops them, then simplicity reaches them with a quick selling appeal

By Ray O. Fischer
Display Director, So. Calif. Edison Co. Ltd.

IF Confucius didn't say "One picture is worth 10,000 words" he missed a good chance to add a memorable maxim to his famous collection. This principle holds true in many cases, especially in selling, where an appealing merchandise display picture is a valuable aid to sales.

The art of displaying merchandise is centuries old. In ancient crowded market places merchants polished and arranged their wares to make a picture more attractive and salable. The method of displaying goods has improved throughout the years, changing to meet the demands of the ages. Today, our world is fast moving and streamlined, and a display that sells must be of the same nature. Unless it has punch and reaches out for attention, it is passed by unobserved, and time and material are wasted.

Five factors are important in an attention-compelling display:

1. Simplicity.
2. Composition.
3. Color.
4. Light.
5. Motion.

These factors are linked closely. Too much emphasis cannot be placed upon simplicity and composition. The object of displaymanship is to attract attention and tell a story at a glance. The average passerby is not attracted to an overstocked, confused window. The composition or design is the foundation of any display.

Color schemes are unlimited. Greens, yellows and pastel shades are good for spring. Cooler shades of blues and greens are fine for summer, and warmer shades of reds, browns and allied shades are good for the colder months. Naturally the selection of color schemes depends also upon the type of merchandise being displayed, but bright, clean, contrasting colors always lend attractiveness.

The combination of color, light and motion is a valuable factor in displaymanship, and there are numerous ways of getting various animation and lighting effects. Especial attention should be given to good display lighting, for practicing what we preach is a good way to sell our customers.

Animation may be derived from the use of electro-magnets, solenoids, electric motors and various other methods. To insure quietness and durability, fractional hp. motors with the mechanism properly counterbalanced have proved satisfactory.

Display ideas are unlimited and can be dramatized from comedy to pathos. Familiar sayings and maxims applied to merchandise attract attention.

The Southern California Edison Co.'s display department is an activity of the domestic sales department under H. C. Rice, manager of domestic sales. The staff consists of a director and three assistants, S. R. Holland, Ed E. Rondot and R. C. Frampton.

We service 55 offices on the Edison system. Most offices have two display windows, so we make approximately 100 display trims monthly, along with interior merchandise displays, fairs and special exhibits. Our service consists in creating, designing and building these displays, and installing them in our offices throughout the system.

In order to cover our large area, a schedule has been worked out covering four or five offices daily in each district. Great care is taken to protect the displays against breakage, or injury to the mechanism or art work in transportation. Two display trucks have been designed especially for this purpose.

Because display windows vary in size, we have adopted center panel backgrounds with adjustable side wings, which enable us to stretch or squeeze them to fit practically any window.

In order to maintain the department economically, great care is taken in the selection of good materials such as lacquers, oils, poster colors, display boards and draperies.

Special attention is given to the construction of the mechanism animating the displays. Usually after it is completed, it is run several days to eliminate unnecessary noise, and animation is checked carefully to avoid breaking down after it has been installed. Repair and mileage costs are thus avoided.

In connection with the display service, we maintain a complete commercial art service, producing posters, cartoons, charts, maps, scenic backgrounds, etc. With our various silk screen processing methods, thousands of posters are distributed over the Edison system and to electrical dealers.

Action to Sell Light

Sales Front News—

—New Excise Tax
—Campaigns
—Exhibition
—Oddities and Ideas

New excise taxes imposed in the 1941 law include a 10 per cent manufacturers' price tax upon refrigerators, self-contained air conditioners, electric, gas and oil appliances (except household washers), and electric signs. The impost upon electric bulbs and tubes is five per cent. These levies are effective as of Oct. 1. As the bill went through the House, only electrical appliances were scheduled for excise taxation but the Senate added the words, "gas and oil."

The law lists these appliances as subject to the new excise levies:

"Electric, Gas and Oil Appliances—Electrical direct motor-driven fans and air circulators; electric, gas or oil water heaters; electric flatirons, electric air heaters (not including furnaces); electric immersion heaters; electric heating pads and blankets; electric gas or oil appliances of the type used for cooking, warming, or keeping warm food or beverages for consumption on the premises; electric mixers, whippers, and juicers; and household type electric vacuum cleaners."

The definition for the tax on signs reads: "Neon-tube signs, electric signs and electric advertising devices." The tax on bulbs covers light bulbs and tubs, but not articles taxable under other provisions of the act (neon signs, for instance).

San Diego Bureau

The Bureau of Radio & Electrical Appliances of San Diego County held its annual banquet on Sept. 17 at the Hotel San Diego. Featured speaker of the occasion was Dr. Frederick P. Woellner, who addressed the gathering on "Ten Certainties for 1942". Also prominent on the banquet program was a discussion by the heads of appliance manufacturing and distributing companies on the industry outlook.

Ninth annual electrical show sponsored by the Bureau has been set for Nov. 25-30 at Balboa Park, Calif. According to Bureau estimates, this appliance show should be outstanding in view of the tremendous residential increase in San Diego.

Elected to serve the Bureau during the coming year by member firms, the following officers will guide the organization's course: President, R. E. Harris, S. D. Standard Electric Corp; first vice president, C. W. Kinmore, Kinmore Electric Co.; second vice president, Charles Kerridge, George Belsey Co.; treasurer, Sam L. Hall, Electric Supply & Distributing Co.; and directors, H. L. Benbough, Pr., Benbough's; Taylor Brown, Parmelee Dohrmann Co.; Harry Callaway, Thearle Music Co.; A. K. Chamberlain, Refrigeration Equipment Co.; Paul Dupont, Walkers; Elmer B. Hazie, S. E. Auto Electric Co.; E. W. Meise, S. D. Gas & Electric Co.; William Powell, Coast Electric Co.; Ben Rogers, Firestone Service Stores (past president); P. P. Schmitt, Schmitt Furniture Co.; Paul Weinstock, Electric Service Co., and Lou Weise, Weise, Ltd.

Credit Terms

Although mandatory regulations are the order of the day for United States installment terms and down-payments merchandising, British Columbia and other Canadian provinces are still in the debating stage concerning drastic curtailments. The Retail Credit Grantors' Assn. of Vancouver has held numerous meetings with leading merchants in British Columbia, and has been in communication with the Hon. J. Illsey, Minister of Finance, planning voluntary control on long-term selling before government action is necessary.

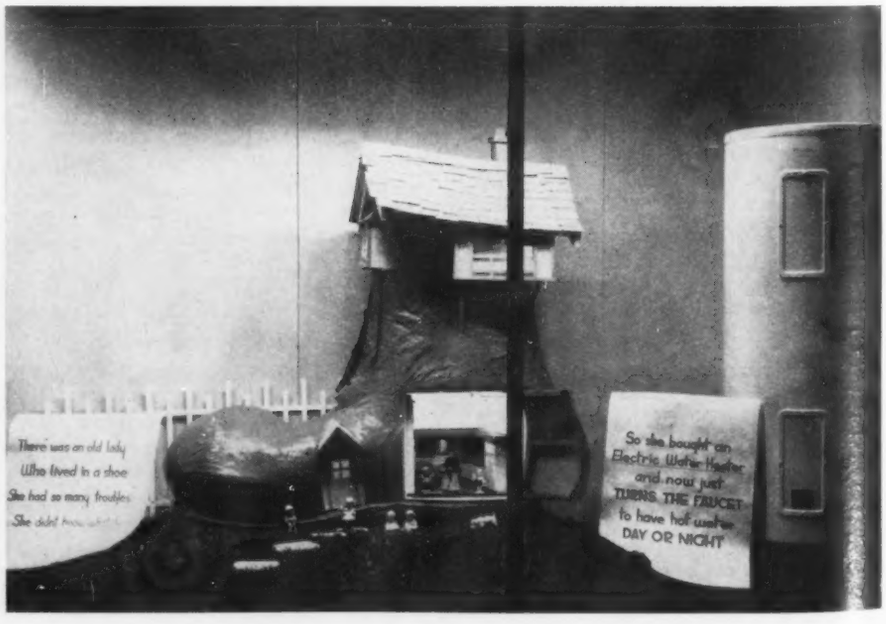
It is felt in B.C. that credit managers and merchants are better fitted to devise a solution than a government commission, and it is generally agreed that credit terms should be tightened. Merchants were also critical in their remarks at the Vancouver meeting on the allowance of amounts far in excess of actual value on trade-ins, and curtailment of this practice and elimination of advertising of credit terms was suggested. The Victoria, B.C., Retail Credit Assn. have agreed to follow the Vancouver lead and it is expected these terms will become general in B.C. It is believed other Canadian cities are planning similar action.

Idaho Trio

Dealers in the Idaho Power Co. territory are enlisting actively in three fall campaigns which started Sept. 2nd. Objective sought by the combination of dealers and Idaho Power Co. employees is he sale of 1,200 water heaters, 17,000,000 watts in lamp globe sales and 1,200 light conditioning units. In dollar volume, the total will run near to $188,000.

Water heaters will be pushed hard for the next four months. A special effort will be made to furnish dealers with good prospects through the field staff of the power company. Advertising and promotional help, bill boards, radio and bill stuffers will be brought to bear on the market. Dealers are offered a $5 bonus for the sale of a 40-gal. or larger all electrical installation.

Light bulbs and light conditioning equipment will be pushed, it is hoped, from every store handling electrical appliances in the district. To tie in with the oncoming winter and the resumption of school, the campaign will include advertising in the papers, home service department promotion, floor demonstrations on dealer floors by the home service department and active assistance by the company personnel.



Kenneth Newport, display man, Boise office, Idaho Power, designed this attention-getting water heater window

Utah Active

Realizing that education of its retail appliance salesmen must go on in spite of defense priorities and curtailment in production of electrical appliances, dealers, wholesalers and utilities of Salt Lake City through the Electrical League of Utah on Sept. 22 began a series of retail sales instruction using as a basis the Modern Kitchen Bureau's visual education series produced by Vocafilm Corp.

The course will continue for the ten week period and will follow the recommended outlines of MKB. W. C. Winder, veteran sales instructor of the Salt Lake City Board of Education is leader of the classes which are held each Monday morning 8:00 a. m. to 9:00 a. m. at the Utah Power & Light auditorium. Cost of the course is $5, with 50 cents credited each student for each class attended, so that those attending all 10 classes will obtain this exceptional training at absolutely no cost.

The original class has been received with so much enthusiasm that a second is being planned for Salt Lake City and one for Ogden to be sponsored by the Ogden Electrical League.

An activity for dealers designed to sell 600 electric ranges and 100 electric water heaters in 60 days during the months of Oct. and Nov. has been launched by the Utah Power & Light Co. and Western Colorado Power Co. throughout both systems.

Called the "Harvest Campaign" it points to the opportunities in a boom market with over 5,000 electric water heaters now in service and more than 42% saturation of electric ranges. It lists as a reminder to dealers for use in their sales presentation, the benefits to be enjoyed from the use of both. The company outlines its supporting advertising and dealer-help campaign in the literature being distributed to dealers by company representatives.

A meeting to present the utilitiy's new low all-service power rates and fall sales program for promotion of electric ranges, water heaters, and light conditioning was conducted by the Utah Power & Light Co., Sept. 2. W. A. Huckins, utility sales manager, presided.

● "IT HAPPENED IN THE KITCHEN," full-color, talking motion picture produced by the Modern Kitchen Bureau, is an excellent promotional offering of this organization. The picture runs a little over a half hour and is designed for showing to consumers, telling the all-electric kitchen story by scenes in various attractive electric kitchens.

Sheriff Pat and cakes

Cops the Prizes

"Hey, you! Pull over to the curb! Say, have you heard about my new cake recipe?"

This might happen in East Los Angeles, Calif., where cooking is the unusual hobby of six-ft., burly Irish Frank "Pat" Shanley, deputy sheriff. At night and on his days off Pat unbuckles his gun belt, wraps a dish towel around his waist for an apron, and cooks on an electric range. And he does it so well that his cakes have won prizes from those of the town's best cooks.

For the last two years the cop has copped first prizes in the community's cake baking contest. This year, with two hundred entries in the contest, Pat's cake was judged almost 100% for smooth texture, even layers and delicious taste.

The luck of the Irish has nothing to do with Pat's cooking success, for he gives much of the credit to his electric range.

"For successful baking, everything must be measured accurately, including the oven heat," Pat says. "I never have to guess about the temperature of my electric range oven—I know it is always right. I set the thermostat, put in the batter and take out the cake, perfectly baked top and bottom, 30 minutes later —that's all there is to it."

Pat cooks in an all-electric kitchen including, besides the range, an electric refrigerator, water heater, mixer and numerous small electrical appliances. He has used his range for four years and it stands high in his favor. Besides its dependable cake baking, he also likes its shrinkless meat roasting and its surface cooking with very little water.

Even his wife acknowledges Pat's supremacy in the kitchen, and she and their two children are proud of father's culinary prowess.

A member of the United States Army for 12 years and a former captain, Officer Shanley learned to cook during K.P. duty in his early years of service. He has pursued his hobby ever since, becoming so accomplished that he gives cooking demonstrations to show the ladies some tricks of their own trade.

Montana Drive

Montana Electrical dealers and the Montana Power Co. have recently united in an outstanding electric cookery and water heating merchandising campaign. Over 3,000 electric ranges were placed in operation in the company's territory during 1940, and in 4½ months of 1941 campaign period 2,077 new installations were added to this record. Not only were old range marks surpassed but electric water heaters and hot plate sales also set new records, according to the company.

Feature of this sales record is the gradual up-climb of dealer sales in proportion to the utility's. Slightly less than 50% of the electric ranges sold were accounted for by dealers, contrasted against 33% in the 1940 campaign. Electric water heaters made gains over a year ago, showing an increase of 123 units.

● URGING DEALERS to brush up their light conditioning centers and take up I.E.S. lamps and light conditioning equipment and small appliances to cushion the effects of major appliance shortages, the Pacific Power & Light Co., Yakima, Wash., also stressed the importance of tying in with the reopening of schools. The Sept. number of its dealer paper "Dollars to Dealers" shows previews of advertising to be run on light conditioning during that month.

● THE CRESCENT in Spokane advertised that the new regulations governing installment buying were essentially the same terms that it had been offering all along, a good turn to give to a necessity.

● "THE SWITCH IS ON", theme of the Modern Kitchen Bureau's fall campaign will be employed in the fall range and water heater campaigns of Utah Power & Light Co., Mountain States Power Co., Southern Colorado Power Co. and possibly other western utilities in their sales promotional activities on behalf of both dealers and themselves.

● GEORGE A. LOWE CO., Ogden, Utah, General Electric dealer, recently celebrated the opening of a new and enlarged appliance department. At a series of appliance demonstrations, Nancy Finch, assistant manager of residential sales for the Utah Power & Light Co., demonstrated the advantages of electric cookery.

HOME FURNITURE, INC., Reno, has a new home and a new appliance department headed by B. H. Robison, seen below in the display room. Opening day at right

B. C. Exhibition

Despite probable shortage of supplies, and tightening up in terms of installment sales, there was a large display of electric appliances at the Canada Pacific Exhibition at Vancouver, B. C. this year. Displays were maintained by manufacturers, jobbers, the central station and by retailers.

McLennan McFeely & Prior Ltd. had two displays, one given over to electric appliances and furniture, and a second display in the agricultural group of buildings stressed electrical farm equipment. Wosk's Ltd., operating five Vancouver stores, had a large selection of ranges, refrigerators, washers, etc. During the exhibition the firm offered a bonus of a circular mirror with every range sold.

Dumont Electric, 96 Kingsway, Vancouver, stressed washers and ranges. The Sterling Furniture Co., Main and 13th avenue, showed radios, washers and ranges with their furniture. Canadian Marconi Co. had table and portable radios in large variety, and a more limited selection of larger sets, as well as combination units. Y. Franks placed the stress on washers and ranges. Buckerfield's Ltd., featured electric incubators.

The B. C. Electric had two displays; one located on the grounds with open front was devoted to the agricultural and horticultural promotional work of the company. This stand featured baby pigs, in a straw filled stall, kept warm by a big electric lamp, cattle in an electrically equipped barn where milking machines were shown in operation, and a well equipped farm kitchen as well as all other types of electrical farm and rural equipment.

The second booth of the central station was a huge courtyard with a revolving globe in the center. Arranged around the sides were various displays of an educational nature dealing with kitchen planning and layouts, a better light-better sight presentation; a fluorescent lighting installation in a model room, and groups of ranges and refrigerators, the only two appliances now handled by the B. C. Electric.

Beatty Bros. Ltd., the Hudson's Bay Co.; Forst's Ltd.; Beach Foundry Ltd.; Standard Electric & Radio Co.; T. Eaton Co. Western Ltd.; Sterling Furniture Co.; The Hoover Company; Wosk's Ltd., and Frank Johns all staged displays in various sections of the exhibition.

● To INCREASE the utility salesman's knowledge of all-electric restaurant operation, the Commercial Electric Cooking Council has produced a manual, "Sales Training—Commercial Electric Cooking". Chapters on the restaurant owners' likes and dislikes among salesmen, appliances, service, how and why he buys equipment, appliances needed in different types of food-serving establishments, and operating costs of various establishments should be of value to the commercial cooking salesman.

● R. K. HILDEBRANDT recently opened the Electric Service Supply as a new electrical dealer in Coeur d'Alene, Idaho. He opened his own accessory and appliance store in Carrington, N. D., leaving after two years to come west and sell appliances for Gamble stores in Idaho, Wash. and Montana.

Among Pots and Kettles

Pot & Kettle Clubs in Seattle, Portland, San Francisco, Oakland and Los Angeles opened the fall season with enthusiasm. Associated Pot & Kettle Clubs, headed by Harry O. Davis, Savory, Inc., appointed past presidents G. A. Hallenscheid, W. S. McCune, Frank Regan, Geo. Slater, and C. A. L. Wilson, all of Los Angeles, as the convention committee for 1942.

Seattle Pot & Kettle Club meets Tuesdays in the Viking Room, Dolly Madison's, Seattle. Officers are Arthur J. Martin, pres., Theodore Rueger, 1st vice pres., J. Graham Cairns, 2nd vice pres., Joseph F. Parker, treasurer, Sam Maizels, secretary.

San Francisco Pot & Kettle Club meets Fridays in the Green Room, Western Merchandise Mart. Officers are L. W. Sauer, pres., Homer Wilson, 1st vice pres., Jack Jackson, 2nd vice pres., Frank Overbeck, 3rd vice pres., Homer Meet, recording secretary, Fred Witmore, corresponding secretary.

Los Angeles Pot & Kettle Club has as officers Carl Hobson, pres., and Al Howson, 1st vice pres.

Oakland has started a Pot & Kettle Club with Perry Miller as pres. It meets on Thursdays at the Athens Club.

Portland Pot & Kettle Club started the year with Pres. Harry Meier, Clif Beste, vice pres., Ken Ball, 2nd vice pres., Lloyd Simon, secretary and Ed Trumbull, treasurer.

Campaigns

Bureau of Radio and Electrical Appliances, October, will issue 50,000 fall and winter radio logs. November will have the electrical show.

Washington Water Power Co., October, personalized "all out for better seeing" campaign. Salesmen being trained to give tailor-made prescription for each customer's house.

Pacific Power & Light Co., October, lighting campaign.

California Electric Power Co., October, refrigerator campaign; November, ranges and water heaters.

Idaho Power Co., October-December, annual lamp globe, floor and table lamp and water heating campaigns. Also dealer range and water heater campaign. Special event planned is series of dealer cooking schools. Also planned are exhibits in nine local fairs in southern Idaho.

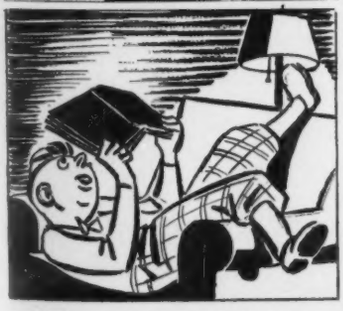
British Columbia Electric Railway Co., Ltd., October, employee lamp globe campaign; which will be continued in November. Special event planned for November is pre-Christmas sale of table appliances, lamps.

Utah Power & Light Co., and Western Colorado Power Co., October, range and water heater campaign, which will also extend through November.

PRINT IN BINDING

ELECTRICAL WEST Sales Guide

Enlist Now for SIGHTSAVING



Cartoons courtesy of the National Better Light-Better Sight Bureau

A humanitarion cause as fine as this—saving the precious eyesight of youngsters in the home—is extra incentive to any salesman with a heart. To be sure there is profit or commission to be made from sales of more equipment, but the best satisfaction comes from the good that really correct lighting will do for those to whom it is sold. It is like a special dividend. And what salesman lives with soul so dead that does not feel his work more worth while when the equipment he sells performs a genuine service of benefit to his customer. He can really put all he has into that kind of selling. Another advantage to selling IES Lamps is that, so far, they are more available than some of the major appliances. So they still offer an opportunity for salesmen to keep at it.

Enlist in the fall and winter campaign of the Sightsaving Legion, the drive against gloom and glare, against eyestrain and its axis partners, the eye destroyers.

EYE EASE

I.E.S. LAMPS

OCTOBER 1941

Copyright 1941 by Electrical West, 68 Post St., San Francisco. All rights reserved including permission to reprint in whole or in part

Selling is fun

WHEN YOU KNOW YOUR STAFF!

It Has Everything for Everybody

During October, November and December 23 national magazines will tell your public that the IES lamp is **"The Lamp that has Everything for Everybody,"** that the IES tag guarantees a lamp bearing it to be so built as to incorporate 54 approved specifications, developed after careful study by the Illuminating Engineering Society, a non-commercial, professional society interested only in better seeing conditions, and that any manufacturer may make such lamps provided he meets these standards of quality and performance. But only those which are tested and found to have this quality and to give this specified lighting performance by the Electrical Testing Laboratories can be so certified.

Carrying this same idea to your own community the local utility will be telling the people in frequent newspaper ads and billboards, no doubt, the need for Better Light for Better Sight. All this emphasis on IES lamps and light conditioning, with the added punch of low rates, add up to a big bargain in anybody's money. And all such copy directs customers to see **you.**

So when they come, carry on the same theme —talk the same idea—and you will sell better lamps. With the variety of IES lamps now made there **is** a lamp that will be "everything" for **every** body, no matter what his or her interest or need may be.

You know this, of course. It is obvious to you and maybe a bit tiresome by now. But every time a survey is made it is amazing, and pretty disappointing too, to find how few people really know the story or appreciate it —yet. The ads sort of prepare the way. They talk of eyes and seeing and how poor lighting impairs vision. They tell folks to "see your dealer" and when they come in they are interested, but chances are they are ignorant too. The really informed customer is rare and a little judicious questioning will usually reveal when you have such an unusual person to talk to.

Of course, in talking with the customer you will want to speak about the finish and the quality and the design and any gadgets your line may have. That is only natural. Such things are what make your own lines distinctive from those of competition. But remember if you can, that if you back up the idea of better light for better sight, better vision, and more cheerful surroundings, you can turn more mere shoppers into real buyers. And instead of a single lamp sale you should be able to sell many to that home.

As you explain a detail of construction, be sure to interpret it in terms of what it will do to make their enjoyment of the lamp keener. For example: The translucent bowl is to soften the light, prevent glare from reaching the eyes, and to reflect upward enough general light to keep the balance between the more intense light just below the shade and on the book or sewing, and the light in the room, just right. The eye will not be required to make extreme adjustments between brightness and dark. This makes for comfort and relaxation instead of eyestrain.

The real essence of selling is to create a picture of a very desirable nature and then offer the IES lamp truthfully as a means to obtain that desirable situation. To refresh your memory as to what desirable conditions can be created by good lighting, look over this reminder list. These are all things you know and perhaps think your customer does also. But again, it won't do any harm to recall them to her mind either, and it might be welcome news to her. These list the "good that you do" with the sale of good lighting:

Save sight—the most precious sense of all. Loss of efficiency of the eyes necessitates expensive medical care. It reduces the enjoyment of life. So if good light saves sight, it is a real benefactor.

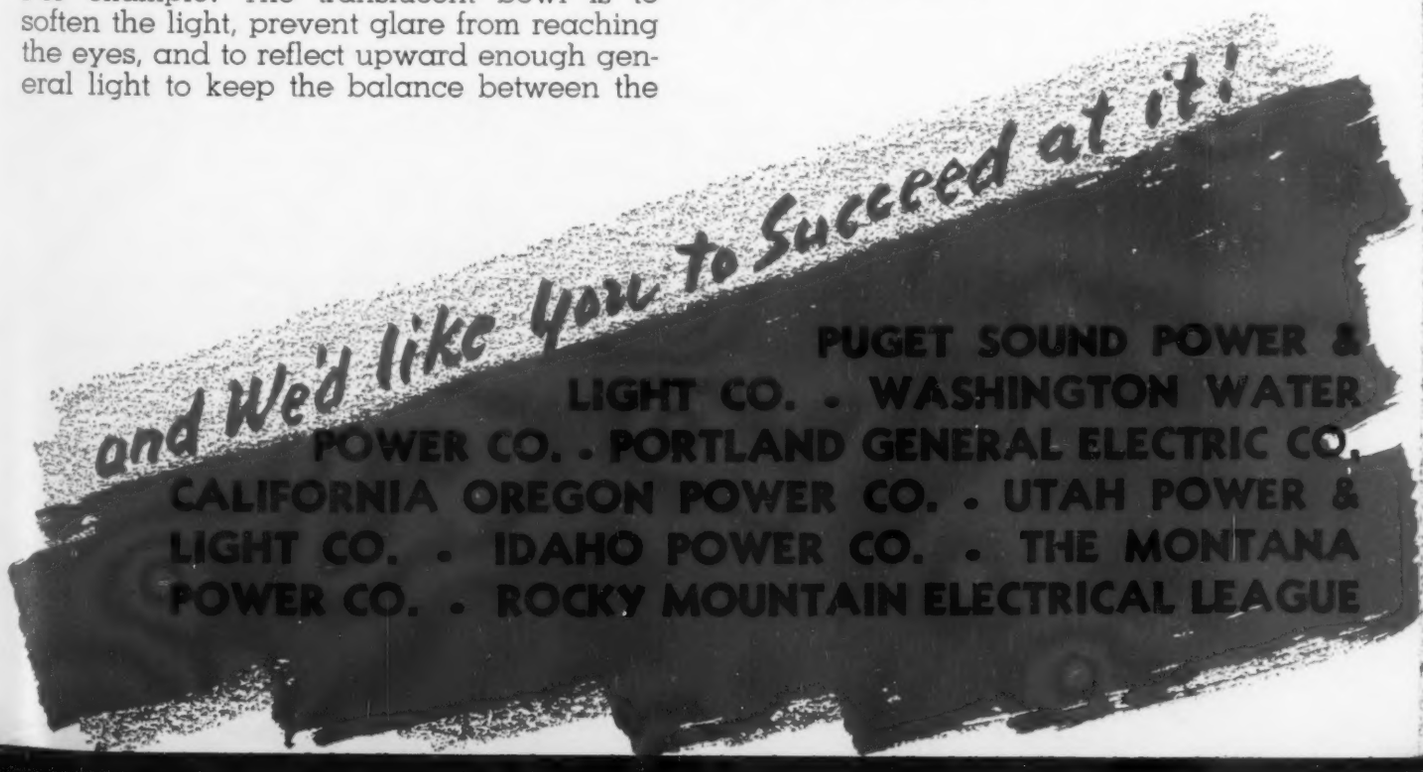
Helps posture—with good lighting it is natural to sit up straight for there's no need to twist around to try to see or avoid glare.

Speeds seeing—reading, sewing, hand work of any kind is seen quicker, done faster, and easier. It is apt to be more accurate too.

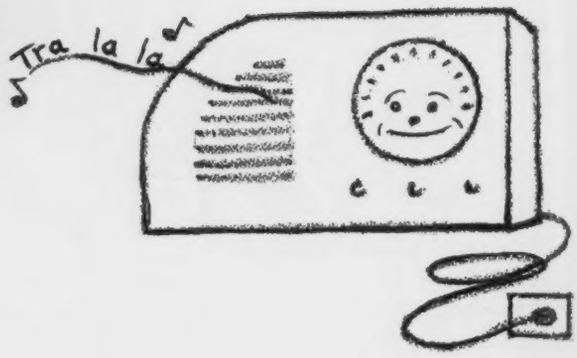
Brightens—all colors are true, decorations and details seen at their best, persons too look healthier and happier when no harsh shadows line their faces.

Safer—where light is spread evenly over a room no half-seen objects lie in wait to trip you.

Pep up with light—the nerves can relax when there's no strain to seeing. Yawns and sleepy tired eyes are less likely and a more sociable, carefree evening will be yours. Let good light help your morale in these otherwise trying times.


and We'd like You to Succeed at it!
PUGET SOUND POWER & LIGHT CO. • WASHINGTON WATER POWER CO. • PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. • UTAH POWER & LIGHT CO. • IDAHO POWER CO. • THE MONTANA POWER CO. • ROCKY MOUNTAIN ELECTRICAL LEAGUE

"Stuff" to Know



Let 'em See Lamps

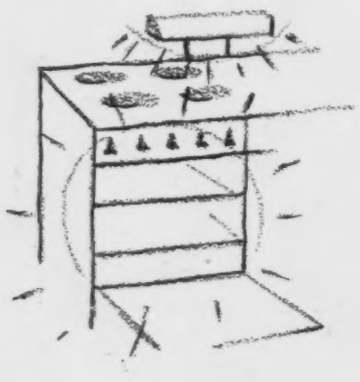
Seeing really aids selecting when it comes to floor and table lamps. So if other merchandise is hard to get and there is less of it to display, let them see lamps.

Windows touch your customers right at the point of sale. If you create an interest and a desire to have the merchandise, all they have to do is walk in. It is human to want to see what you buy. A window display adds glamor to the merchandise. So it's worth while to spend time on window displays—the less money the more time.

Even a single IES lamp, if that is all you can spare, can be made to tell a story of the benefits possible from that kind of lamp. Ribbons running from important features of it to window cards can tell **the reason why.**

It is hard for a customer to judge the added value of lamp on a floor crowded with samples. Better selling comes when the lamp she favors can be taken from the mass floor display over to a small space fixed up like a room at home and tried out and looked at singly there.

An IES lamp right at your Light Conditioning center offers many an opportunity to talk a minute or two about it and interest those who come in merely to buy a bulb.



Switch to Switches

Just as people switched to electric light in the good old days they are switching to electric ranges today when the comparison is made to them between the old—and the new electric way. Compare too the really built-in lighting facilities on an electric range and the makeshift on competitive ranges. Call attention that the lighting is always [illegible] and that the same cleanliness co[illegible] with electric cooking too.

Radio Programs are Back

Summer with its daylight saving time is over and back troop the big name radio programs to the airways. Summer static is gone too and the season for radio sales is here again. Radio manufacturers fortunately use less of the critical metals than other large appliances and nearly all of them have announced fair to normal stocks for the winter trade. A few models may be culled from the lines but the basic models, both console and table, remain.

Phonograph combinations now enjoy the best volume they've ever known. What's more, one of the big radio and record manufacturers has said there will be no shortages on records. The discs use no vital materials and even the home recorder blanks are being made of acceptable substitutes. Here is a filler for the hole left by other appliance shortages, then.

World news never in history has been so important or so fast changing. Radio is the medium by which hot news breaks first. Often it is at the very scene of history in the making. Today a radio is a necessity.

Sets of five years or more ago are ready for replacement—a big market to sell to. More marriages these days mean more new homes starting, each needing a radio.

No need to tell **you** to make the most of these opportunities. You are already selling radio and selling it hard. But the thoughts above may stimulate an angle you hadn't thought about.

"Stuff" to do

Adequate Wiring Reaches the Pursestrings

Long term, low payment loans make the banker realize that quality wiring and satisfaction are an insurance to his loan

DESPITE the emergency and a growing shortage of materials, adequate wiring continues to grow in public acceptance, thanks to the unremitting efforts of the promotional organizations of the West which have made it one of their major activities for the year. This acceptance is even filtering through to government housing projects and certainly to the wiring of defense industries.

Material shortages have not yet become acute except for some particular fittings or devices and in limited areas. While the situation may be further restricted in the months just ahead, the possibility that the major defense projects requiring wiring materials will have been completed early next year gives rise to the hope that residential wiring will not feel the full force of curtailment which many industries have had to face.

Talk of restricting materials for home building in the class of home costing over $6,000 continues to be heard. However, the place where adequacy is most needed is in the home of smaller size where a limited budget often selects curtailment of wiring as the means of saving on the total cost. Yet it is in these servantless houses that the facilities for labor-saving uses of electricity are most needed by the occupant. In the family of smaller means, more of the domestic tasks are done at home and electricity is an invaluable aid to low-cost performance of essential services such as laundering, house-cleaning, cooking more of the meals at home, sewing and other tasks requiring the benefits of good lighting.

A new and important point of attack upon the wiring situation was launched this year in a series of meetings throughout the West addressed by Arthur E. Schanuel, field representative of the National Adequate Wiring Bureau. That new approach was to the banking and financing interests involved in the financing of home construction.

Report of some of these meetings was carried in the July ELECTRICAL WEST, page 45. In that the spectacular meetings at the Los Angeles Electric Club, another at the San Diego Electric Club, were described in some detail.

In Fresno, Calif., the meeting was sponsored by the Fresno Electrical Contractor-Dealer Assn. presided over by T. H. Curry, electrical contractor

To the Financing Agency, Builder, and Home Owner

Salient appeals voiced by A. E. Schanuel, field representative, National Adequate Wiring Bureau, in his western talks, briefly summarized:

1. Today's home building program is different. Homes are built to sell at prices in line with the lower middle income bracket. In the roaring 20's, home financing was based on a 40% loan with a 3-year first mortgage. Today home financing is based on a 90% loan with monthly payments for 15, 20 and 25 years.

2. Owner satisfaction may rate 100% at the time the loan is made. But how well can it be maintained throughout the long payment period?

3. We know that it takes from 6 months to 1 year for the owner to become aware of the shortcomings of the wiring installation of his new home. With the increased demands on the wiring installation during the first 5 years, there may grow a continuing dissatisfaction with the home.

4. The critical period in the financing institution relationship with the home owner will come between the 9th and 11th years. At that time the depreciation will exceed the total amount of the owner's initial and monthly payments. If a satisfactory relationship can be maintained up to that time, there is assurance that it will continue over the entire payment period.

5. The electrical job is one of about 35 operations in building a home on which the appraiser must qualify as an expert. Electrical wiring, installed, according to the industry's minimum standards developed over a period of 8 years of study and negotiation (1) relieves the buyer's anxiety about the adequacy of his installation, (2) makes the electrical job a one-step operation for the builder, (3) rates plus value with the appraiser, (4) is the financial institution's assurance of owner satisfaction through the critical period of its relations with the owner and borrower, and (5) is the user's guarantee of convenience, safety, and resale value throughout the years.

and president of the Association. The audience included besides electrical contractors, city electrical inspectors, appliance dealers, manufacturers and jobbers representatives, utility salesmen, the representatives of local banks and the Federal Housing Authority.

Participating also were E. G. Stahl, sales manager, San Joaquin Power Division, Pacific Gas and Electric Co., who spoke of the utility's advertising support to the program, D. W. Haire, sales supervisor, Fresno District, and Geo. E. Zelhart, chairman of the wiring committee of Pacific Coast Electrical Assn. H. G. Ufer, western superintendent, Underwriters' Laboratories, Inc., was also a speaker.

At Spokane several meetings were arranged by H. C. Bender, secretary, Spokane Adequate Wiring Bureau. First was that of the Spokane Mortgage Men's Assn. Next Schanuel spoke before the Spokane chapter of the American Institute of Architects, then later at a construction industry committee meeting at which he mentioned the new wiring specifications that the Exchange Lumber Co. of Spokane had adopted to make every home built by it come up to the certified standards.

Another meeting was held with the Spokane Automatic Heat Dealers Assn. presided over by Paul Heydon, president of the Spokane Adequate Wiring Bureau and secretary of the Electrical Contractors' Assn.

Yakima, Wash., also had one of its first adequate wiring meetings when Schanuel was in the West. N. E. Winberg, sales supervisor, Pacific Power & Light Co., presided over the meeting and M. G. Kennedy, sales promotion supervisor, introduced Schanuel to the group of contractors, wiremen and architects.

In spite of a summer vacation during which the meetings of the Electric Club of Washington had been suspended, a special meeting was called when Schanuel was in the territory to discuss the subject of adequate wiring. R. W. Clark, merchandise manager of Puget Sound Power & Light Co., arranged the special meeting for the industry group. Schanuel was also made the guest speaker at the regular monthly dinner meeting of the Seattle Master Builders Assn., at which he presented the basis for the construction industry's interest in adequate wiring.

Second Denver Meeting

Federal Housing Administration officials in Denver heard about adequate wiring for the first time at a dinner-conference, July 2, sponsored by Rocky Mountain Electrical League's Adequate Wiring Bureau. Despite rigid specifications applying to structural materials in construction—on which eight regional FHA representatives present were fully informed—nothing had been done (because nothing was known) about installing electrical facilities with permanency equal to the brick, lumber and plumbing in homes on which government loans are made.

Arthur E. Schanuel, field representative of the NAWB, was principal speaker to the audience composed of bankers, FHA executives, lumbermen, contractors, estimators and members of the electrical industry. Fully acknowledging their lack of knowledge on the subject, the FHA group, led by Mark W. Bennett, regional director, asked questions and received direct, informative answers from Schanuel and John A. Baker, field representative of RMEL. Assurance was given that, in future, full consideration will be given to electric wiring.

G. B. Buck, RMEL president, presided at the meeting, presenting the electrical industry's stake in the home loan program with much vigor, emphasizing that the security behind government loans on dwellings becomes more substantial if electric adequacy is on a par with the high-grade building materials now demanded by federal agencies.

The League, following up the advantage gained, mailed literature prepared by the National Adequate Wiring Bureau to all those present at the July 2 meeting, and will maintain personal contact through John Baker and other members of the Denver Adequate Wiring Bureau.

Letter Follow-up

Meetings are fine inspiration but to clinch the fine ideas presented at a meeting so that they stick, a follow-up immediately is good strategy. The Pacific Coast Electrical Assn. made such a follow-up following the exceptionally fine meeting of home loan and financing representatives who heard Arthur Schanuel's talk at the Los Angeles Electric Club. Typical of the letters sent by Victor Hartley, managing director, is the following to one of the guests at that luncheon:

Mr. Horace Shidler, Pres.,
Southern California Home Builders Assn.,

We were very happy to have you in attendance at the Electric Club meeting on Monday, and thought you would be interested in the following summary of the benefits which are enjoyed in an adequately wired home:

BY THE FINANCING AGENCY

Increases investment value by deferring obsolescence, an adequate wiring installation sustains the value of a long term loan throughout its amortization period by providing the needed electrical facilities to keep it up-to-date.

BY THE ARCHITECT AND BUILDER

The satisfaction of having planned and provided a home for his client that will be enjoyed to the fullest degree of modern living standards by the occupant—one that anticipates his future comfort as well as his immediate needs, one that remains in the "modern" class longer, and one that has a higher resale value in later years.

BY THE OWNER

ECONOMY—Many people do not realize that there is a constant waste of electricity when the wiring job is inadequate to meet the demands imposed upon it.

EFFICIENCY—Full efficiency of lamps and appliances can only be enjoyed when the wiring is adequate to supply the full voltage for which the equipment is designed.

SAFETY—Overload wiring results in overheated wires—an obvious hazard.

CONVENIENCE—Electricity is today's universal servant—it recognizes no income bracket—therefore, in all homes, large or small, the wiring should be carefully planned for a maximum of convenience in its utilization.

Please route this memorandum through any interested department of your organization, and if we can discuss with you in greater detail your concern in this timely subject, we shall appreciate an opportunity to call upon you and explain our free inspection and certification program which is available for your use.

Yours very truly,
VICTOR W. HARTLEY

Public Service Company of Colorado's 90-ft.-long billboard illuminated by Neon, which flashes the arrow launched by the archerette at left to the targets. There is no regular order of hitting. Uncertainty provides an entertaining guessing game.

Low-Cost Mass Contact

Housing exhibit reaches large number of interested buyers

Often participation in a housing exposition is an effective way to get the residential adequate wiring story to a large mass of people at a surprisingly low cost. Northern California Electric Bureau found this out from its experience at the National Housing Exposition in Oakland.

The Bureau, through its members and the local union, provided a certified Red Seal wiring job in a model home which was given away in a name contest. In exchange it obtained from the management of the exposition the opportunity to place under every switch and outlet plate a designation card calling attention to the electrical facilities. A Red Seal certificate was on display and a large card told of the benefits of adequate wiring. More than 50,000 people passed through the house so that the cost of getting the certified wiring story was only 1.5 mils per person.

Inside the exposition, a very simple booth and demonstration supported the model home display. The set-up consisted of a booth draped with velour of dark color against which were several cards carrying salient facts about adequate wiring. A few pieces of metal furniture and a table upon which a demonstration was made with two automatic toasters completed the display.

The toasters were timed exactly alike. One operated on proper voltage, or adequate wiring, and the other on poor voltage, or inadequate wiring. Pieces of bread were put in both and both the time taken and the quality of the finished toast were effective demonstrations of the necessity for proper voltage.

During 9 days of the fair, the two men at the booth alternately discussed the certified wiring story with 679 people who stopped to see the display. Fully 80% were planning homes or had them under construction. These valuable contacts cost only 7 mils per person.

Display house at Oakland Housing Exposition

Carry On!

War Does Not Halt B. C. Home Building

Best illustration that adequate wiring promotion still is being carried on and that results are being obtained from it will be seen from the results of a survey of recent activities on the western front.

Wiring keeps rolling. The defense program, if anything, emphasizes the greater need for wiring adequacy in every type of activity in which electricity can help.

Operations of the Electrical Service League of B. C. are being steadily pushed ahead despite the war, and as commercial, industrial and residential building in Vancouver and district continues to maintain its activity and show an increase in each division over the past, officials of the League are confident that there will be no let-up in construction for the balance of this year at least. This particularly applies to residential building work. As a result there is still a very large volume of business available and awaiting the electrical contracting industry.

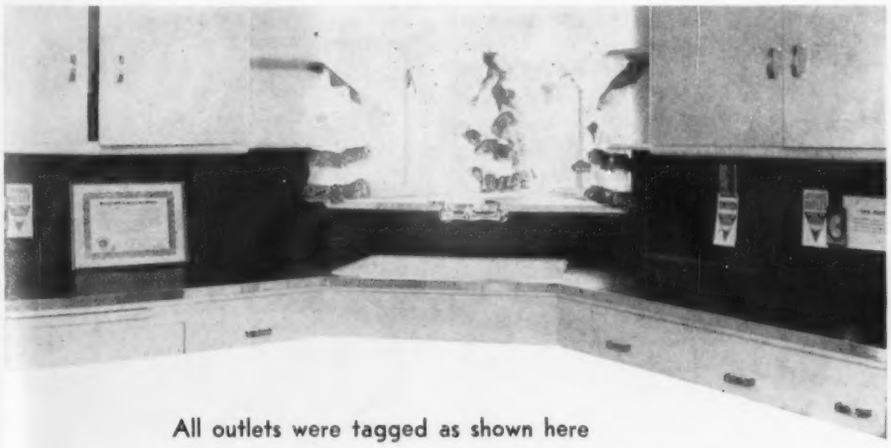
The League has been continuing its general educational work during the past six months and holding regular meetings in conjunction with the Vancouver Electrical Assn. It is distributing to the Association work on installation of appliances for the British Columbia Electric Railway Co. Total amount of this work handled during the month of July amounted to $2,195. If the present volume of work continues, it will mean that installations handled for the central station by the Vancouver Electrical Assn. this year will show a considerably higher total in value than that of any previous period.

For a number of years past, the Service League has maintained a large display at the Canada Pacific Exhibition. Owing to lack of funds it was not possible to proceed with these arrangements this year, but through the cooperation of the B. C. Electric, space was made available to the League for advising the public of the services it offers and promotion of adequate wiring. League field men were in attendance at the Exhibition to answer inquiries and make appointments.

The enormous number of new homes built in Greater Vancouver area during the past year, has made it impossible for League field men to make personal calls on every new home under construction. This problem was met by sending out much more literature and letters than has been its policy during the past few years.

Latest report of the League lists 478 new homes in Vancouver issued Red Seal permits, 13 duplex blocks and 6 apartment blocks, containing 103 suites, a grand total of 607 Red Seal wired homes in the Greater Vancouver area erected during the past year.

Keen competition continues amongst electrical contractors at Vancouver for the leadership on the Red Seal list.

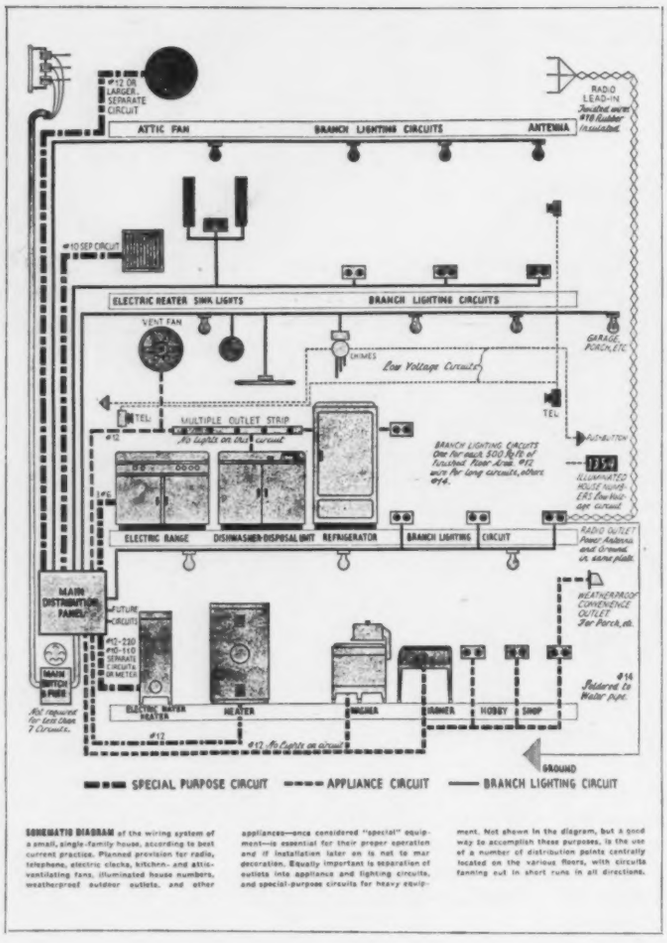


All outlets were tagged as shown here

(U-1)

(U-2)

(U-3)



SCHEMATIC DIAGRAM of the wiring system of a small, single-family house, according to best current practice. Planned provision for radio, telephone, electric clocks, kitchen- and attic-ventilating fans, illuminated house numbers, weatherproof outdoor outlets, and other appliances—once considered "special" equipment—is essential for their proper operation and if installation later on is not to mar decoration. Equally important is separation of outlets into appliance and lighting circuits, and special-purpose circuits for heavy equipment. Not shown in the diagram, but a good way to accomplish these purposes, is the use of a number of distribution points centrally located on the various floors, with circuits fanning out in short runs in all directions.

MATERIAL

Material available from the National Adequate Wiring Bureau for display purposes includes the cut-out cards at the left, useful in a variety of ways. Clever reprint from the Architectural Forum designed to show architects the need for every outlet and circuit specified in the Adequate Wiring certified standards. The Bureau has more such helpful material available.

Standarized Service

Attractively printed in three colors with a perspective view of the house whose roof has been removed, showing all of the electrical outlets and appliances in red, a new pamphlet of letter size has been issued by the Pacific Coast Electrical Bureau containing the Southern California Red Seal standards and combining with them the new standardized service entrance equipment specifications. The standardized service entrance equipment has been set up in five supplementary diagrams to serve floor areas of various sizes in homes from 500 sq. ft. and up.

The diagrams are designed to be given to architects or builders to include with their wiring specifications according to the size of the house to be wired. In listing the service entrance equipment in the certified standards, a minimum service requirement for Red Seal certification is listed by diagram number in the first column and the recommended service diagram for complete electrification of the home in a second column.

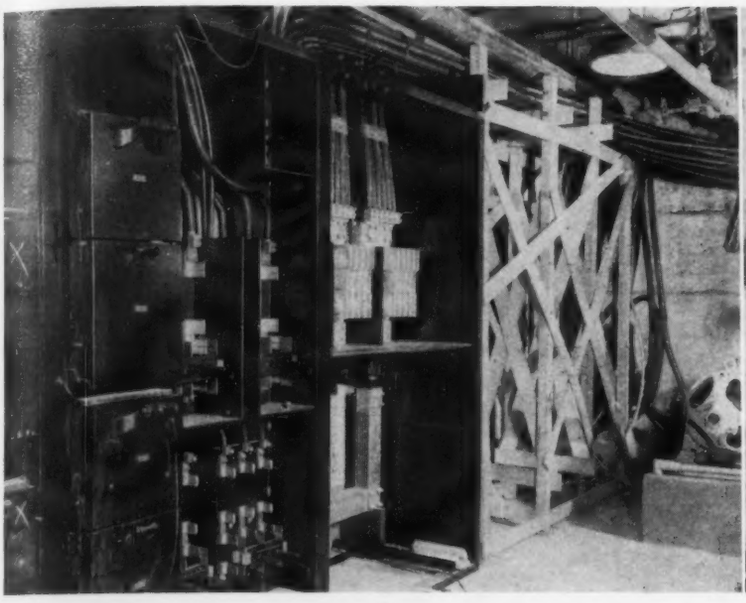
These service diagrams are designed to permit enlargement of electrical service in the home at a later date without the necessity of tearing out service conduits or marring the outside walls by exterior equipment. Plans are under consideration for a similar pamphlet for the northern California standards.

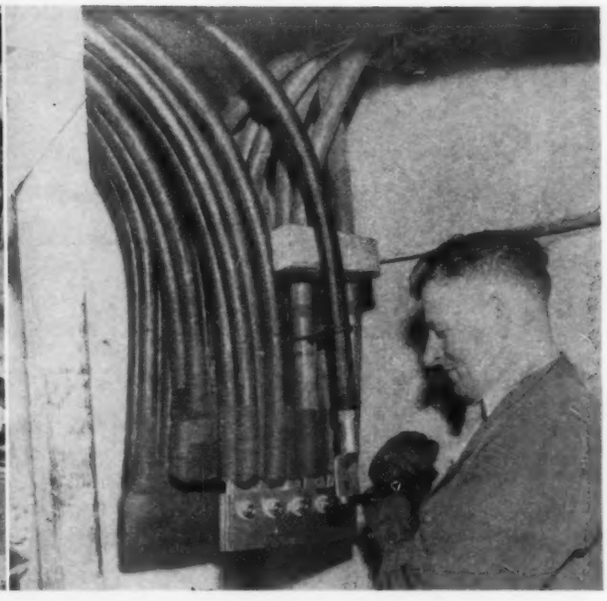
State Fair Exhibit

To the throngs visiting the California State Fair at Sacramento, the Adequate Wiring story was told by Pacific Gas and Electric Co. at a special demonstration booth in one of the main exhibit buildings. The exhibit, designed by J. A. Hill, of the headquarters office, San Francisco, was built in knock-down form and will be available for use in future displays and fairs throughout northern California.

It is designed to show the difference between a Red Seal and a "shot-gun" wiring job by colored lines and lights on a large floorplan. Automatic toasters, motors and lights show the effect of adequate wiring vs. poor voltage. A cutaway of the service entrance hookup is shown to illustrate the need of adequate service facilities. Wiring devices used in residential work make up part of the display. Everything is explained to the public in non-technical terms.

● IMPLEMENTING its re-wiring program, the Edison Electric Institute of 420 Lexington Ave., New York City, has prepared promotional materials to aid utilities to sell the economic advantages of small diameter building wire. A pocket sized kit for demonstration of the wire capacities of ½- and ¾-in. conduit, with samples of standard wire combinations for each size, is being made available. A number of illustrated talks on commercial and industrial wiring with color lantern slides and handbook of information on the small diameter wire and its importance will also be available. Prices for the demonstration kits are $1.75, the illustrated talks on commercial and industrial wiring $17.50, residential $35.00 and the handbook 25c for single copies and 10c for orders of 25 or more.





Above: Switchboard changed over to 3-phase, 4-wire; new service feeders in multiple to 4000-amp. disconnect links. At right: Connecting bars between power company vault feeds and customer's main service cables in multiple

Rewiring an Office Building

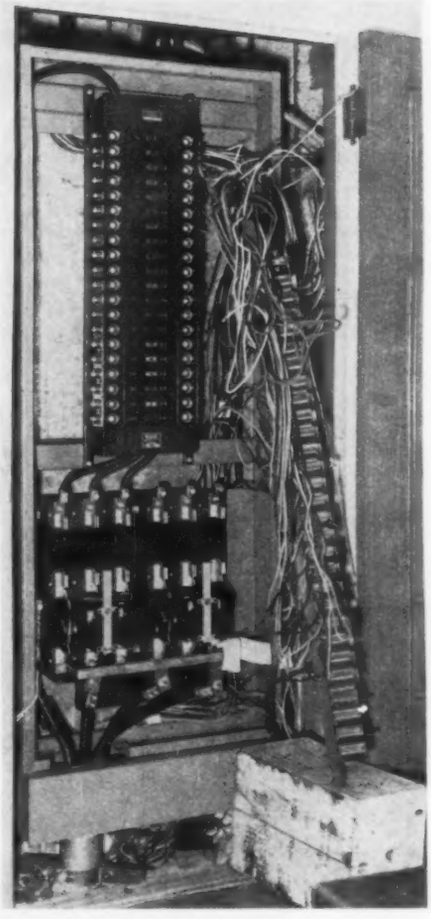
Three steps advocated by Northern California Electrical Bureau followed in Adam Grant Job

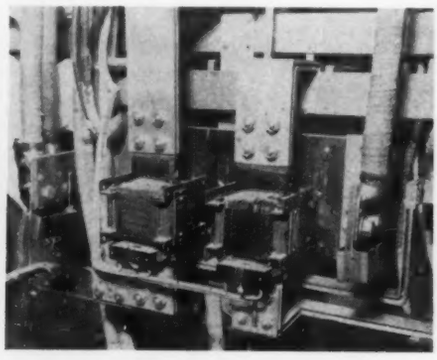
WHEN an office building is rewired, what does it involve? The extensive rewiring program in San Francisco carried on by the industry through the Northern California Electrical Bureau provides the answer. Modernization of the Adam Grant building, done by Charles A. Langlais Co., electrical contractor, is a fair sample.

First step started with a new service of 3-phase, 4-wire—25 new 1,000,000 circ. mil cables, six per leg, to replace three 750,000's, of the old single-phase system. This provides 8 watts per sq. ft. capacity, plus auxilliary power. The old board was rebused and switches changed from double-fused solid neutral to three fused legs for the 3-phase, 4-wire system.

Second step was rehabilitation of the feeder system. Originally three floors were served from each feeder; in rewiring two floors are carried on a new feeder and the old feeder, repulled with small diameter wire, takes care of only one floor. The old double-fused 40-circuit panels were removed and much more compact single-fused panels installed, leaving room for new 200-amp disconnect switches ahead of each.

Third step was to repull the ¾ in. conduits with six No. 12 instead of four old No. 14. Additional switch legs, outlets, and new lighting units completed the job.





Space saving from replacement of old 40-circuit double-fused panels with new single-fused type permitted installation of two 200-amp. switches for this floor and one above, doubling feeder capacity without additional riser costs. At left: A few of the old panels removed. Center: Feeders on the old board ran so hot that little paper boxes were put under feeder cables to catch the melting insulation compounds running out

A Little Infrared Does a Lot in a V

Versatility and ability to take heat right to the job without extensive oven equipment speeds production and reduces time for several western plants

MAKING aerial photographs on a dark night through a dense fog, relieving the charley horse in your arm, the germination of seeds, drying out motors, killing the flies on your dog or industrial baking of synthetic finishes on metal — these are a few of the widely divergent jobs that are being done successfully by means of infrared radiation.

Besides the unique applications pictured on these pages and explained in more detail later, two others reported by Quality Electric Co. of Los Angeles are interesting.

Name Plates and Lumber

The Kennedy Name Plate Co., Vernon, was experiencing a serious bottle neck in the baking of product in a gas oven. Quality Electric designed and built a portable horizontal conveyor with infrared equipment 14 ft. in length by 26 in. in width, the conveyor belt operating at speed from 2 to 10 ft. per min. Twenty-eight 250-watt infrared lamps are arranged in two rows of 14 each, adjustable in height and each section individually switched. This gives a wide range of operating posibilities. Mr. Hayek, president of the concern, reports a 60% saving in production cost, of which 40% represents handling time, and says he is getting a much better product due to uniformity and absence of discoloration of the enamels.

An unique experiment is resulting successfully at the plant of the E. K. Wood Lumber Co., Los Angeles where lumber is dried by infrared instead of the conventional kiln drying. Lumber 1x12 is being dried in 40 min. instead of three days in the kiln. In addition to the great time saving, two outstanding points are that there is no tendency to warp or twist nor for cracks to open up as in kiln drying, also that after kiln drying pitch will work out through paint, while with infrared the pitch becomes granulated and does not affect paint. The importance of this is shown in the statement of one Venetian blind manufacturer that it is necessary for him to discard fully half of his slats after being machined because of minute pitch pockets which work through the finish.

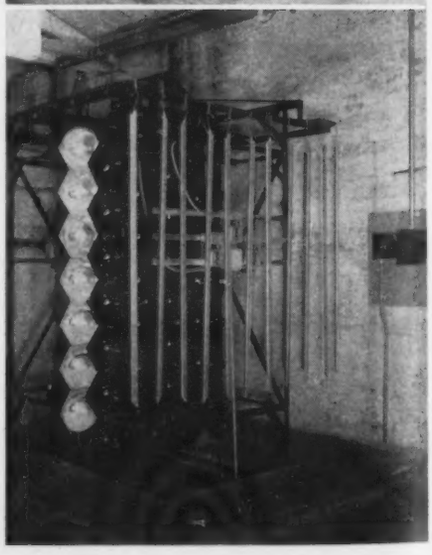
Vultee Preheats Plates

More planes are being put in the sky for Uncle Sam and the Allies by accelerated production methods made possible by use of 406 infrared lamps at the Vultee Aircraft plant in Downey, Calif.

Using the lamps to dry the paint reduces handling time and produces more satisfactory results.

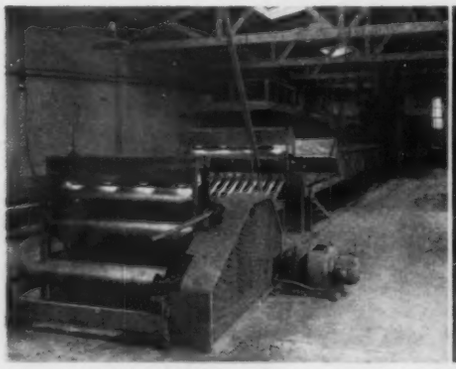
Sheets of aluminum which later are made into wings and fuselages pass on a roller conveyor under a bank of 100 250-watt carbon lamps mounted 8 in. high. These bring the aluminum up to the correct temperature for receiving the protective coating of paint, which is applied by rollers. The sheets then proceed under a second bank of 110 similar lamps, which dry the paint in a few moments.

The processed aluminum then is stacked immediately for stamping and fabrication into various parts of a plane, without the drying delay former-



Airplane parts at Vultee Aircraft plant, Downey, Calif., (above, top) sprayed and paint dried by battery of 250-watt Mazda reflector type infrared lamps. Daniels Glass Co. bakes synthetic finishes on substitute steel moulding (aluminum unobtainable) for glass shower doors in this simple skeleton Fostoria tunnel with conveyor, built-in, by Quality Electric Co. of Los Angeles. Variable speed is incorporated in this and the Windsor job for various types of finish. Each color takes a different speed

Sprayed latex and cork on a burlap base for non-slip mats is cured by passing through a 60-ft. tunnel, equipped with 250-watt lamps, with 375-watt lamps for an initial kick. Compression rolls also infrared heated. Plant of Korktone Co., Los Angeles. Quality Electric installation, as also the delux air conditioned tunnel with variable speed control, selective magnetic control, fan-cooled glass enclosed cooling section for Windsor Shower Dood Co. (below). Both Fostoria installations

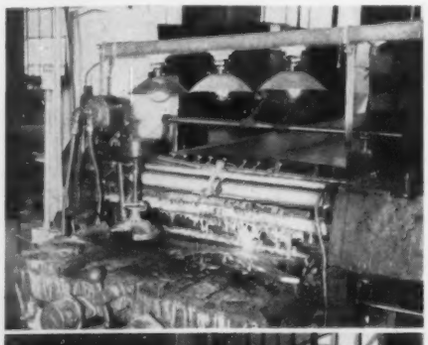


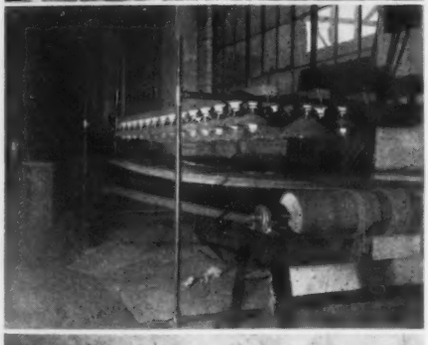
a Variety of Applications

ly entailed, and its requirement of valuable floor space.

Dyes and Glue

Three time and money-saving applications, each one exceedingly simple, of infrared are utilized in the Fleishacker Paper Box Co., San Francisco. Rex Glasscock, electrical maintenance engineer, had long sought solution to some of the peculiar problems in the handling of glue and dyes for the coloring and coating of paper.





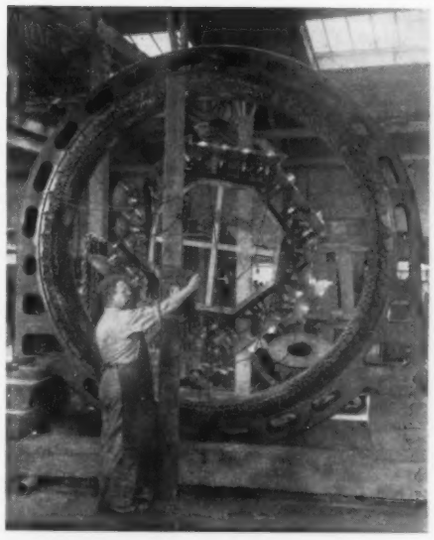
Just three Nalco Dritherm lamps over the glue rolls at Fleishacker Paper Box Co., San Francisco, (top) keep glue from becoming stringy, permit earlier morning start. Same lamps, 38 of them in three adjustable rows over a conveyor belt, dry dye colors on cardboard in 15 sec. and permit immediate stacking (center picture). Motor controls and switchboards at Richmond-Sunset sewage plant, San Francisco, resist corrosion because a a single infrared lamp keeps metal warm, stops condensation

Lamps are mounted on three adjustable and movable supports placed over a conveyor from a dye-coating machine for coloring cardboard sheets. The belts is 27 ft. long. Lamps are placed over about half of its travel so that for 15 sec. a sheet of cardboard is under the rays of 38 260-watt Nalco Dritherm lamps and reflectors. Individually switched, only those required for drying a particular sheet need be turned on.

Formerly it was necessary to space the cards going through the dyeing rolls about the length of a conveyor apart. It was possible only to feed 1,800 to 2,000 sheets during an 8-hr. day. Now they can be fed as fast as the rolls will take them and from 9,000 to 10,000 cards a day can be handled. The cards stack at the end of the belt without offset even with the combined weight of a full stack upon them. In experience, blue dyes take longer to dry than red or orange.

A machine called a selective gluer has a reservoir of glue which is warmed and pumped over rolls. On cold days the glue would roll up and become stringy and it requird 2 hours to bring the rolls up to temperature for working each morning. Three lamps on a strip were placed above the rolls and trained upon the rolls. They are sufficient to heat the rolls so that the glue now runs smoothly and the 2-hr. a day waiting time is eliminated.

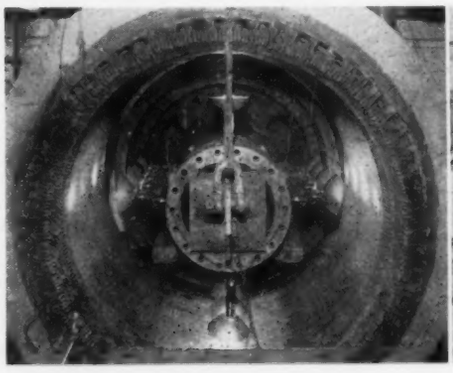
Another application has been to use three or four of these lamps over the mounting machine used to paste coated paper on cardboard. The paper stock used to gather moisture along the edges and as fed into the machine would wrinkle. The lamps draw the moisture out of the paper. Aluminum foil, however, curls up under these lamps and they cannot be used for the coating of metallic paper.

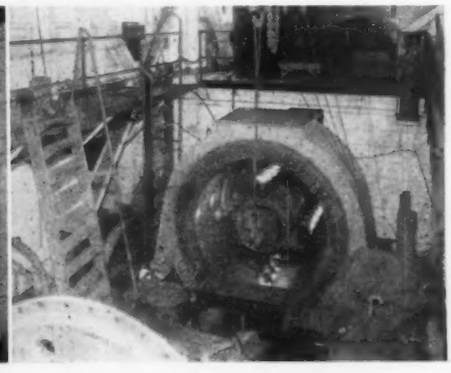


Stator of 550-hp, 150-rpm, 2,300-volt synchronous motor belonging to California Shipbuilding Co. being dried out in Quality's shop. Before drying, stator meggered less than 100,000 ohms to ground; after 30 hr. drying with 8 kw of infrared it meggered infinity

Where humidity is high, condensation of moisture on electrical equipment, particularly switchboards and control equipment, is often the cause of corrosion and early breakdown. The Richmond - Sunset sewage treatment plant at San Francisco is located near the beach and the air is of relatively high humidity to start with. Added to that, the volumes of water handled in the treatment of the sludge increases the atmospheric humidity to a high degree. Trouble had been experienced with the contact parts on switchboards

Difficult problem was solved where time was a vital factor in drying out and baking the stator of a 2,500-hp, 300-rpm, 2,300-volt slip ring motor on the dredge S. C. Hinds, in San Diego harbor, before leaving for Honolulu. Quality Electric, Los Angeles, pushed rotor back against the bulkhead, mounted Fostoria reflector strips around the shaft, moved them around, and did the job in the dredge without removing the stator to the shop. Pictured below is a close up of the stator





and motor control in certain locations.

A simple application of infrared drying lamps in Fostoria gold-plated reflectors has solved some of these condensation difficulties.

Pictured isi the use of a single 200-watt lamp in a reflector trained upon the solanoid controls to a motor located in particularly damp surroundings.

In two other locations, the back of a switchboard had been found to collect considerable moisture from the air. The steel and metal was always of a slightly lower temperature than surrounding air and thus caused condensation. Although a 1500-watt electric heater had been used back of one switchboard in an attempt to raise the air temperature and prevent condensation, it did not prove as effective as a single 200-watt infrared lamp in a reflector located near the very bottom of the board and trained upon the metal surfaces of the base.

In another switchboard, the gold-plated reflector is used with an ordinary 100-watt lamp. Experiments have been tried with other types of reflectors of metal, galvanized, enameled, etc. but the gold-plated one seems to do the job best to concentrate infrared rays. Especially was this found true where the beam is thrown across about 5 ft. of board to a metal surface on the opposite side. An interesting discovery was how little was required to warm the metal sufficient to discourage condensation.

Type S Fuses

Type S or so-called "non-tamperable" fuses were finally standardized as to dimensions for fuse bases and fuseholders and these standards adopted by the Electrical Committee of the NFPA at its meeting in June to consider revisions of the 1940 National Electrical Code. The new Code provisions adopt the dimensions of the type known as "Fustat," originally made by the Bussmann Manufacturing Co. Patent rights to it were released so that any manufacturer may use the same dimensions.

The NFPA Electrical Committee also empowered a subcommittee to draw up a suitable agreement with the Bussmann company to provide for license to use the patent and abide by the standards. Licensing will be without cost to licensees and will be available to anyone. Specific design features released are the specifications for the locking mechanism which seals a fuse-holder against use of a size of fuse larger than the one originally locked in place.

The Electrical Committee did not issue interim revisions of the wiring tables but referred these back to the appropriate article committees for a report in December 1942. The matter will be discussed quite thoroughly at the various Section meetings of the International Assn. of Electrical Inspectors this fall.

IES! Lighting Course

San Francisco and Sacramento classes well attended

Demand for a lighting course similar to that given Pacific Gas and Electric Co. salesmen by John Walsh, has developed a similar course for wholesaler and manufacturer salesmen and contractors. The course started under the auspices of the educational committee of San Francisco Bay Cities Section IES. Classes will be held in the Western Furniture Exchange, San Francisco, with one two hour evening meeting each week, beginning Sept. 15.

The 8-week course will include sessions on sources, language, photometry, vision, control and design. It will be under the general direction of John Walsh as chairman of the educational committee and Dr. Leland Brown of Stanford University. A parallel course with the same 12 or more speakers is planned to run concurrently in Sacramento.

Following this lecture series, an advanced lighting course comprising eight sessions on lighting applications will be initiated the week of Jan. 5, to cover such subjects as color, paint and glass, and lighting applications for industry, schools, offices and stores. Cost will be $5 per registrant. Text used will be one prepared by Westinghouse Lamp Co. with homework assignments developed in a General Electric course.

Preliminary arrangements have been completed for the San Francisco Bay Cities Section to cooperate with the Architectural Society of San Francisco on a similar program for architects in 1942.

● 1941-42 "Better Light-Better Sight" material produced by the National Better Light-Better Sight Bureau features booklets on residential, commercial, industrial lighting. A full-color talking motion picture is another lighting promotion feature of the program and newspaper mat advertisements are also offered. On the display side there are two large animated displays and two counter and window displays, which feature comparisons of lighting with good equipment and inadequate equipment. Cartoons, booklets and newspaper clip sheets complete the promotional program.

● INSTALLATION of the conduit system and the interior wiring for the three steam plants of Pacific Gas and Electric Company described in the pictorial article on pages 33 to 39 of this issue was made by the H. S. Tittle Co., electrical contractors of San Francisco, and under the personal supervision of Tom Harris, its manager. The electrical crews employed numbered more than 100 men and the job required a large crew during construction lasting over a year.

● EARLE DUNSMUIR is continuing for another year as president of the Vancouver Electrical Association. Dunsmuir is head of Dunsmuir Electric, Vancouver, B. C. J. D. Carmichael is vice president; John S. Homersham secretary and R. Sutherland treasurer. Members of the executive are: Bert Graham, Graham Electric; R. Beaumont, Beaumont Electric & Radio; C. Longley, Longley Electric Co. Ltd.; J. A. Holt; E. Crosby, Crosby Electric Co.; R. Hall, Electrical Service League; T. Barwood, Ideal Electric.

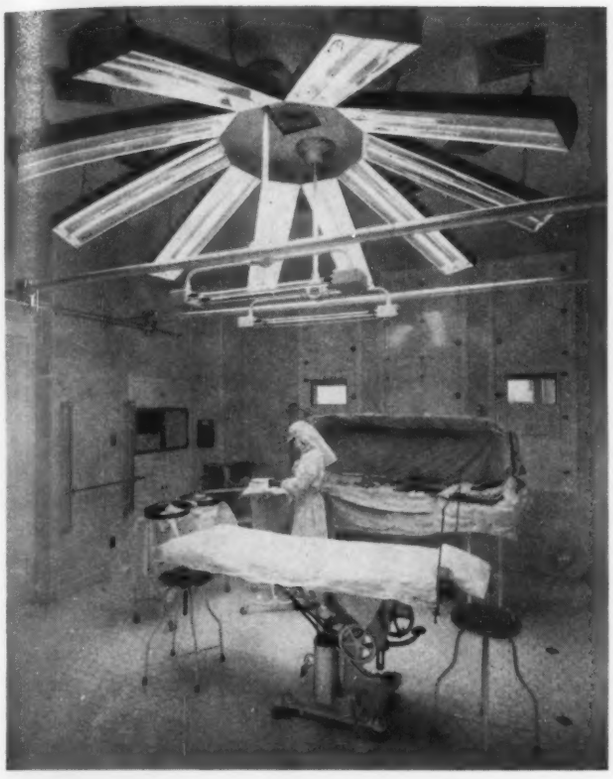
Traveling Lab

Ray Larrabee's little red truck has grown. Successful operation of the Underwriters' traveling field laboratories, one of which was manned by Ray Larrabee, field engineer for Underwriters Laboratories, Inc., in the West, has occasioned the expansion of these laboratories to trailers pulled by a tow car.

The trailer is air-conditioned, is equipped with laboratory equipment for routine tests in the field, a public address system, and a 110-volt fluorescent lighting system. Large windows permit demonstrations which can be seen through the window to be made to crowds. Small groups can be taken inside the trailer for demonstrations.

Field tests are made on purchased samples of type R housewire, flexible cords, armored cables, loom, fuses and circuit breakers. Mechanical measurements, current tests, durability and life tests of insulation, and tension tests are given wires, and for fuses calibration is made of actual performance against label ratings.

Area covered by Larrabee with western unit No. 3 includes the eleven western states. Contacts are made with fire departments, electrical and building inspection authorities, city, county, state and federal bureaus, electrical groups and schools and colleges. The field laboratory serves both an educational purpose and as a field check to determine the performance of materials bearing the Underwriters' label.



Fluorescent

Who

Providence Hospital, Seattle, Wash. Installation designed by Westinghouse engineers, installed by hospital maintenance department.

The Need

High concentration of shadowless and glareless light upon the operating table, plus general illumination and sterile air to reduce infection hazards.

Conditions

Previous lighting was from eleven 500-watt incandescent units with lens control inset in the 12-ft. ceiling.

Installed

A ring made up of 10 Westinghouse 2FA40, concentrating fluorescent two-lamp luminaires with 40-watt F white lamps; outer rim 10 ft. from floor, inner rim 11 ft. Also four 30-in. Sterilamps, 8 ft. from floor suspended from the ceiling at each side of the operating table.

Results

Illumination on the operating table is 200 ft. candles. Radiant heat is materially reduced.

LIGHT for an OPERATING ROOM and for an AIRCRAFT FACTORY

Mercury

Who

Douglas Aircraft Co., Inc., new "blackout" factory at Long Beach, Calif.

The Need

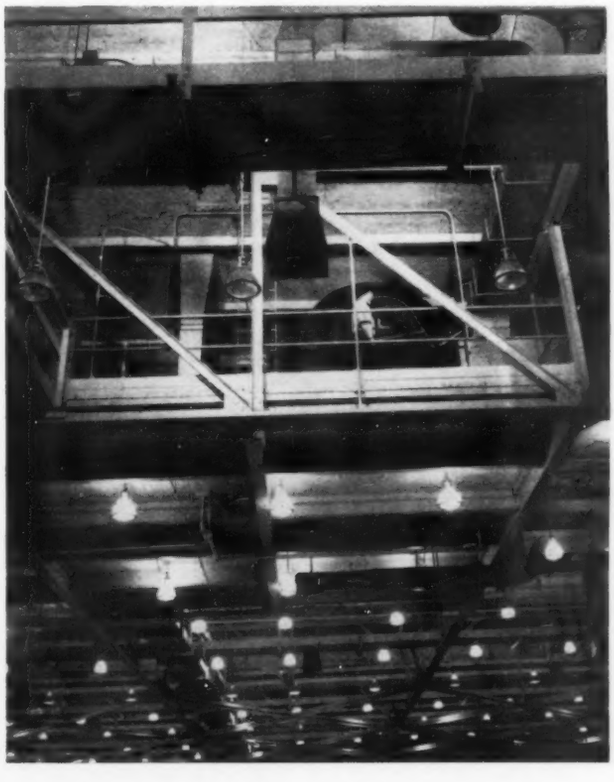
Plenty of glareless and shadow-free illumination from artificial sources to facilitate the manufacture and assembly of aircraft, in a variety of factory and inspection operations.

Conditions

Large open area factory buildings with bottom of roof trusses ranging from 20 to 35 ft. from the floor, completely "blacked out", without windows, air conditioned.

Installed

More than 5,500 kw. of lighting, of which there are 9,000 high intensity mercury and 5,000 daylight 40-watt fluorescent lamps. In final assembly buildings, mercury 400-watt lamps in Holophane high bay reflectors, on 8-ft. 4-in. x 15-ft. spacing; 35-ft. mounting height; 3.2 watts per sq. ft.; initial intensity 8 ft-candles. In subassembly building, spacing 8 ft. 4 in. x 12 ft. 6 in.; 3.8 watts per sq. ft.; initial intensity 77 ft.-candles; mounting height 22 ft., glassteel diffusers. Receiving and storage buildings; RLM domes, glass glare spill rings, two lamps per outlet, spacing 15 x 16 ft., mounting height 30 ft., intensity 45 ft.-candles. Fluorescent lighting in offices, welfare and cafeteria buildings.



EMEA *Dope Sheet* — *Edited by Howard C. Park*
EMEA of So. Calif.

Lost Terminal Markings—II

Standard NEMA Three-phase Delta Connected Motors—How to Find Them

Three-phase delta-connected double-voltage induction motors, as indicated in Fig. 2, also have nine leads, but there are only three separate circuits. Each circuit has three leads.

Standard NEMA and ASA Delta Connections

For 220v. Delta—Connect T1, T6 and T7 together and use them for one line lead, connect T2, T4 and T8 together and use them for a second line lead; connect T3, T5 and T9 together and use them for a third line lead.

For 440-v. Delta—Connect T4 to T7, T5 to T8, and T6 to T9; using T1, T2, and T3 for line leads.

Test Procedure

In tests to locate terminals for Delta connections, it is necessary to have some facilities for measuring resistances. It is necessary to determine only comparative values, not actual values. This may be done by using a wheatstone bridge, millivoltmeter or other device. A source of direct current should be available. However, correct values used should not exceed current rating of the motor.

The three separate circuits may be determined by lamp or buzzer tests.

Leads T1, T2, and T3 should be next located. They may be located by approximate measurements of resistance. By measuring the resistance in each of the three circuits it will be found that the resistance between one of the leads and the other two is equal and approximately half the value of the resistance between the other two. The leads thus located in each circuit, may be *permanently* marked T1, T2, or T3. The remaining leads in the circuit with T1 may be temporarily marked T4 and T9. The leads with T2 may be marked T5 and T7. The leads with T3 may be marked T6 and T8.

After the circuits have been determined and thus marked, the motor should be connected to a 220v. line and run. Terminals T1, T4, and T9 should be used as line leads, all other terminals should be left disconnected. *All leads will be alive* and care should be taken not to permit short-circuiting between leads of the same group.

Voltage Test

T4 and T7 should be connected together and voltage read between T1 and T2. If the voltage reading is 440v. the markings are correct.

If the voltage is approximately 380v., interchange T5 and T7 and T4 and T9 and read voltage again.

If voltage is found to be 220v. interchange both T5-T7 and T4-T9.

When the voltage is found to be 440 v. mark T4, T5, T7, and T9 permanently, taking care that a voltage reading of 440v., is obtained between leads

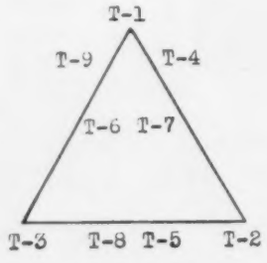


FIG. II

T1 and T2 when T4 and T7 are connected together.

A similar test should be made of the circuit containing T3. The lead which, when connected to T8 produces a reading of 440v. between T1 and T3 should be permanently tagged T6, the remaining lead will be T8.

If the markings are all correct, a reading of 440v. should be obtained between T1, T2, T3.

Checking Test

As a check to the above test the motor should be shut down and reconnected, using T2, T5, and T7 as line leads. Be sure that T7 is connected to the same line lead to which T4 was previously connected. The direction of rotation should be the same as that of the previous test.

Stop motor and reconnect, using T3, T6 and T8 as line leads. If the line leads that were previously connected to T2, T5, and T7 are connected respectively to T3, T6, and T8, the motor will rotate in the same direction as formerly.

If the tests all check the motor should be ready for service by connecting T4 to T7, T5 to T8, and T6 to T9, using T1, T2, and T3 as line terminals.

Southern California

Motors and some of their history and possibilities were explored for the Electrical Maintenance Engineers Assn. of Southern California at its Sept. 16 meeting at Scully's, Los Angeles, when Wagner Electric Corp. handled the program. Glenn Farr, pres., RKO Studios, turned the meeting over to L. G. Tandberg, of the Wagner company.

"Over 50 years of progress in the electrical manufacturing industry" was handled by Tandberg. Then W. C. Smith spoke on "Single Phase Motors, their characteristics, construction and applications." L. E. Long of the same company then spoke on "polyphase motors, their electrical and mechanical characteristics."

Attention was called to the employment service maintained by EMEA for its members. The office of the association, 703 Architects Bldg., Los Angeles, acts as an employment clearinghouse for employers and employees.

Northern California

Electrical Maintenance Engineers Assn. of Northern California held its first fall meeting Sept. 25 at Veneto Cafe. By popular request, Walter Heston, Northern California Electrical Bureau manager and program chairman, presented his illustrated demonstration on "Fluorescent Trouble Shooting" (see ELECTRIAL WEST Aug., 1941, p. 55).

Following the talk on trouble shooting, a fluorescent clinic was held. Representatives of the lamp manufacturers were present to answer questions and discuss new developments in fluorescent lighting.

W. C. James, pres., welcomed the new associate members to the organization admitted for the first time since the change in constitution to permit such memberships.

● 100-WATT 5-ft. fluorescent tubes will provide illumination for the Cleveland industrial school to be opened shortly in Butte, Mont. These tubes are to be installed in industrial-type fixtures, which are especially applicable for mechanical work. Western Plumbing and Heating Co. was the successful bidder in the rewiring of electrical portions of this construction.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 43

SUBJECT ..... WOOD SAWING
CUTOMER ..... CITY FUEL CO.
TYPE OF BUSINESS ..... FIREWOOD

Prepared by Lloyd Steele for the Industrial Section

Loading conveyor with cordwood to be cut by saws after which it will dump into truck automatically. Note continuous operation provided by electric rig on saws and conveyors.

The City Fuel Co., Seattle, Wash., experienced trouble with their gasoline motor driven saw rig. It was semi-stationary and stopped frequently. An electric motor was considered, and with some imagination and ingenuity, an old truck frame and cab including the truck motor were used to construct the machine shown in the accompanying pictures.

The electric motor drives the conveyors, chains and saws. It is mounted directly behind the cab on the frame of the truck and underneath the conveyor platform. By means of pulleys and belts, the saws and the two conveyors are connected to the motor. Since building the first machine, this company has built two more and had another constructed by an iron works for their Everett, Wash. yard. All of these rigs are portable.

Customer's Conclusion

J. R. Tucker, sup't. of the fuel company, says, "these machines are much faster and save about $1.00 per cord over the old method of cutting the cord wood."

Advantages

(1) Firewood is cut to exact length desired. (2) Electric drive is fireproof. (3) Electric operation has reduced labor cost and maintenance cost.

There is no gas tank refilling. One man can control operation of the entire rig under normal operating conditions.

In the large view above the conveyor is being loaded with cordwood to be precisely cut by the saws. After the wood is cut it falls on a second conveyor (at right in the picture) which dumps the lengths into the fuel truck at the far right. By the employment of the motor-driven rig, two handlings of the wood are eliminated.

Equipment Replaced

Gasoline Motor.

Equipment Installed

One 40 hp., 440-volt, 3-phase induction motor, cost $300.

One 200-ft. 3 conductor No. 6 cable, cost $120.

Total cost, $420 plus $255 for installation.

Operating Data

(On monthly basis)

Product ..... Firewood
Production ..... 600 cords
Labor ..... 120 man hours
Fuel, electricity ..... 1800 kw.-hr.
Operating period ..... 6 hrs. per day
Other vital data: One man can handle this machine under normal conditions, labor data is furnished on this basis.

Motor and starting switch mounted on truck frame and connected by belts to saws and conveyors for driving

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 44

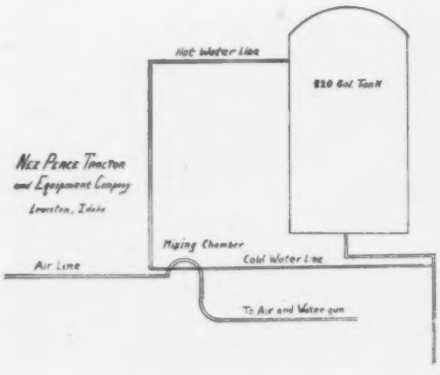
SUBJECT.....WATER HEATING
CUSTOMER.....NEZ PERCE TRACTOR & EQPT. CO.
TYPE OF BUSINESS....TRACTOR SALES AND REPAIR
SIZE OF BUSINESS.....TWENTY EMPLOYEES

Prepared by J. Harley Ferris for the Commercial Section

Replacing a portable diesel steam cleaner, which was hired at $5.00 a job, with electric water heating equipment resulted in material savings on cleaning overhaul jobs and repaint jobs for the Nez Perce Tractor & Equipment Co. of Lewiston, Idaho.

Advantages

The electric system is available at all times for the cleaning of parts (see accompanying picture) which saves mechanics' hours each day and increases output and net profit of the shop. Added convenience to the workers is offered by the heating system as hot water is run to shower rooms and washrooms.



Method Employed

Roughest of dirt is knocked off with air gun, using cold water and hand bars. The solvent is sprayed on grease and road oil, and allowed to stand at least one-half hour. Water at 204 deg. is then applied through air gun, and the job is completed. As the machines are torn down, all shielded parts are also cleaned speedily and easily with a blast of the gun. For jobs of this size an 8/32-in. orifice is most satisfactory.

Customer's Conclusions

Adam Schlee, shop foreman, pictured with the tank, says: "I am convinced that our savings in time alone on parts cleaning will more than pay for the outfit each year, leaving as net profit all we used to pay out as for cleaning. I'm sorry we didn't get this idea a couple of years sooner."

Equipment Replaced

Portable diesel steam cleaner.

Equipment Installed

One 220 gal. off-peak automatic water heater; 14 kw. with special adjustable thermostat for 204 deg. water; cost $385.00.

One DeVilbiss air and water gun, connected to present air compressor; cost $16.00.

Operating Data

Cleaning done.....approx. 110 tractors, parts yearly
Fuel.....electric
Thermostat set.....204 deg.
Connected load.....14 kw.
Energy consumed....2000 kw-hr. per mo.
Energy used for cleaning average tractor (No. 4 Caterpillar) 5½-ton job.....50 kw.-hr.
Energy cost per tractor.....40¢
Time on job.....average one hour

Infra-Red For Brooding Chicks

Use of infra-red lamps as heat sources for chicken brooders improves growth, lowers mortality rate

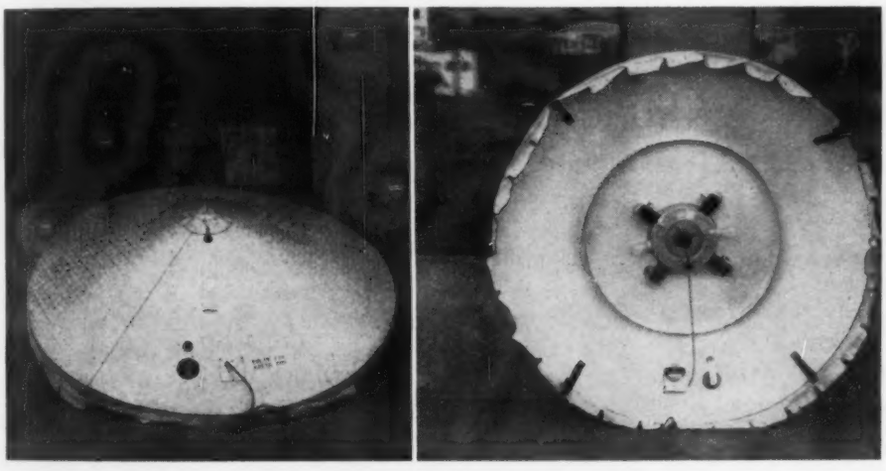
A NEW development in the application of electricity to poultry raising is the use of infra-red ray lamps as heat sources for chicken brooders. The first actual field tests were conducted in the summer of 1940 by M. F. Donahae of the Shady Nook Hatchery at Ramona, California. The application of the infra-red lamps was developed by James Lyon of the Lyon Rural Electric Co., San Diego, California. This firm now builds three standard models of infra-red ray brooders which are being used by poultrymen as distant as New York and North Carolina, and Oregon and Washington.

The two test broods were composed of 250 chicks each, which were kept under the infra-red rays for seven weeks. At the end of that time they were better feathered, heavier and larger, and more uniform, than any of over 5000 chicks from the same source that were brooded with ordinary brooders during the preceding weeks at the Shady Nook Hatchery. All during the tests the chicks were more alert and active than any chicks they had ever brooded in twenty years experience. The average chick brooder mortality rate over this period had been five percent. The mortality rate in the infra-red brooders was under three percent.

An important feature of the use of infra-red rays is the fact that the litter in the brooders is kept dry at all times, requiring fewer changes and saving labor. The constantly dry litter also reduces the possibilities for bacteria development which does occur in damp litter.

The penetration of the infra-red heat rays expands the veins and arteries in the chicks and stimulates blood circulation. This produces better food assimulation into the meat tissues and speeds chicken growth.

The brooder manufacturer has developed careful control of the ray. The largest size brooder, 500 chick capacity, is a galvanized sheet metal round canopy type hover 67 inches in diameter.



Views of the infra-red brooder unit showing dome containing an aluminum heating drum in the center of which is a small electric fan which draws air through peak vent holes at 35 cubic ft. per minute. Amount of air can be adjusted by vents.

The dome contains an aluminum heating drum in the center of which is a small electric fan which draws air through peak vent holes at the rate of 35 cubic feet per minute maximum. This is 7 cubic feet per minute per hundred chicks, a reserve of 5 cubic feet per minute per hundred chicks over the minimum requirement of 2 cubic feet per minute per hundred chicks. The amount of air can be adjusted by opening or closing some of the vent holes. On the under side of the heating drum is a circular frame in which are mounted horizontally four 200 watt infra-red lamps and two ordinary 30 watt white lamps called attraction lights. A small concave aluminum reflector just over each infra-red lamp deflects the rays downward. A convex metal protection panel just beneath each lamp spreads the rays and prevents them from shining directly down on the chicks at such close range. These top and bottom reflectors give a uniform heat-ray distribution throughout the entire brooder.

The thermostat is usually set at 100 degrees. When this is reached, the infra-red lamps turn off and the two white attraction lights turn on to maintain a constant degree of illumination. When the temperature drops a full half degree the infra-red lamps go on and the attraction lights go off. The infra-red lamps are especially made for these brooders and are kept at a low candle power by a heavy frosting.

Experienced poultrymen who have tried this new heat source for chicken brooding find that it not only speeds growth of the chickens but results in a much better and finer grade market chicken.

Electric Farm Future

PG and E meet urges strong farm electrification program.

THAT opportunities for additional farm electrification business exist even when power usage on the farm reaches the total it does in California, was the message given to 150 manufacturers, distributors and dealers in farm electrical equipment by Pacific Gas and Electric Co. executives at a meeting held September 3 at Sacramento. Vice-president R. E. Fisher chairmaned the meeting.

Factors affecting market opportunities as set forth by A. M. Frost, rural power sales director, included: California farm income of $4,741 (1940) was the highest in the U.S.; national average was $1,339. Income in 1941 is expected to exceed $6,000 per farm. With an annual consumption of 1,100,-218,000 kw.-hr., California farms use more electricity than all electrified farms in the other 47 states. In California 94.8% of all farms are electrified. Over 71,000 of these are on the PG and E system. The average rate in California for farm power is 1.39 cents per kw.-hr.

Typical of the marketing information maintained by the company for use of dealers and distributors was that cited by L. J. Brundige, division sales manager, for the Sacramento area. That district has 5,000 pumping installations totaling 235,000 hp., and new ones are being added at the rate of 350 per year. The annual increment totals 4,000 hp. and the expenditure averages $50 per hp. The 500 dairies use 150 milking machines, 95 milk coolers, 33 sterilizers, 85 motor-driven separators and 15 hay choppers.

ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO

The all-industry magazine of progress, established 1887 and incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity." Contents Copyrighted

EXECUTIVE AND EDITORIAL STAFF

James H. McGraw, Chairman of the Board Howard Ehrlich, President
George C. Tenney, Vice-President and Editor
W. A. Cyr, Associate Editor
Wayne Snowden, Engineering Editor
W. E. Becker, Assistant Editor
R. A. Balzari, Publishing Counselor
Roy N. Phelan, Secretary-Treasurer & Manager
Hans Hjorth, Typography

MEMBER AUDIT BUREAU OF CIRCULATIONS

ADVERTISING REPRESENTATIVES

Ralph H. Flynn, 330 W. 42nd St., New York
William B. Heaps, 520 N. Michigan Ave., Chicago
Roy N. Phelan, 68 Post St., San Francisco, DO 4600
Stephen H. Babcock, 2-144 General Motors Bldg., Detroit

EDITORIAL ADVISORY BOARD

UTILITIES: R. E. Fisher, Vice-President in Charge of Public Relations and Sales, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President and Commercial Manager, The California Oregon Power Company, Medford; Frank McLaughlin President, Puget Sound Power & Light Co., Seattle; L. T. Merwin, President, Northwestern Electric Company, Portland; W. C. Mullendore, Executive Vice-President, Southern California Edison Company, Ltd., Los Angeles . . . MANUFACTURERS: J. H. Pengilly, Exec. Vice-Pres., Square D Company, Los Angeles; C. A. Dostal, Pacific Coast Manager, Westinghouse Electric & Mfg. Co.; A. S. Moody, Northwest Manager, General Electric Company, Portland . . . WHOLESALERS: J. I. Colwell, Northwest Manager, Graybar Electric Co., Inc., Seattle; N. W. Graham, Graham-Reynolds Electric Co., Los Angeles . . . CONTRACTORS: Lloyd Flatland, Globe Electric Works, San Francisco; S. G. Hepler, Arrow Electric Co., Seattle . . . DEALERS: H. H. Courtright, President, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Sec'y-Mgr., Bureau of Radio and Electrical Appliances, San Diego, California.

Before It Is Too Late

ALMOST everyone in the electrical business who thinks of the industry as something more than a vehicle for giving him or her a job, has asked the question, "Why hasn't the industry ever had a national goodwill building program?" You who have read this have sat in "bull sessions" where the subject has been debated pro and con. You have heard the American Telephone & Telegraph Co. lauded for its national advertising and heard it praised for its high standing with the American public. Any and every time someone asked, "Why can't the power companies get together on such a campaign?" you have heard excuses, alibis and a few sound reasons why it was "impossible."

Some of that reasoning is worth examining. "Conditions are different for every company" was one excuse. Yet every company wanted, primarily, the goodwill and confidence of the largest possible segment of the American public! "They'd be sure then that there was a 'power trust.'" Ever hear of a "meat trust" or a "bakery trust?" They are just two industries that have successful national campaigns. "What could be said that would apply nationally?" The same thing that is said locally to make friends and win esteem. But the clincher was "How are you going to get that many individualistic, opinionated, independent organizations together?" Seldom has anyone ever had an snswer for that one.

Well, the seemingly impossible has virtually been accomplished. A group of forward-looking, virile, courageous companies, displaying the brand of initiative that has characterized many other undertakings of the industry, has started something. Almost enough individual companies have recognized the advantages that will accrue from such a national program and have agreed to underwrite it.

So don't be surprised if some night soon a top-flight radio program comes over one of the networks with the commercial signed by "Your Local Electric Company." Or if you pick up a national magazine and find a page carrying a powerful story on the advantages of electric service under business ownership. When that times comes, the thing to do is to register your approval so that the campaign may continue. Heavens knows it has been needed for a long, long time.

San Francisco Votes Again

WHEN San Francisco voters go to the polls November 4, their heads should hang in shame for the humiliation and degradation imposed on a sovereign city by federal bureaucracy. Not only is Plan 9—the measure proposing a $65,500,000 revenue bond issue to put the city in the power business—economically unsound, but the conditions under which it was imposed on city officials and voters alike ill befit a democratic nation. In conforming to the stipulations laid down by Secretary Ickes, the city abjectly surrendered its proprietary rights and deferentially threw democratic processes to the wind.

In defiance of popular will as expressed in seven previous elections when similar proposals were turned down, San Francisco officials sacrificed civic dignity and civil rights when they accepted the Ickes' stipulations. They surrendered the right of petition by agreeing to oppose any initiative to amend the Raker Act. They agreed to publish only affirmative arguments for the measure in the official election pamphlet. They obligated themselves to submit no other charter amendment or bond issue on the same ballot. In case such a measure was placed on the ballot by initiative, they agreed to withdraw the bonding proposal and re-submit it at an Ickes' approved special election.

Tyranical and arbitrary interference of this kind should be enough to insure the defeat of the Plan 9 proposal. However, there are other valid reasons why this measure should go the way of its predecessors. Its financial soundness is open to serious question. Instead of $66,500,000, the ultimate cost of the undertakings proposed will probably exceed $90,000,000. (The original Hetch Hetchy project

was estimated to cost $44,000,000; to date the city has $142,700,000 invested in it.) The alleged "surplus" of $5,233,000 is mythical. Sound accounting and utility operating experience would add $3,362,000 to the operating expenses and reduce the surplus by that sum. Ignored entirely is the present $24,600,000 invested in Hetch Hetchy power facilities, both in figuring interest charges and in setting up retirement reserves. Also Plan 9 ignores the $2,400,000 income the city has been receiving for its power.

Finally, the city has never made a concerted effort to amend the Raker Act so as to secure for itself the same privileges of disposing of its power that other government agencies, including the federal government, enjoy.

Certainly there are ample reasons why San Francisco voters should give Plan 9 the same kind of a turn-down that similar proposals received in 1933, 1935, 1937 and 1939. Maybe they will if every man and woman in the electrical industry here in the West who has friends in San Francisco, sees that these friends know the arguments against the measure and votes.

1939 Was a Good Year

NOT long ago Westbrook Pegler proposed a national slogan—"Keep your shirt on." It is sound advice today for all of the people in the industry who are worrying about priorities, material shortages and other effects of the defense program. Dealers and distributors, particularly, have been suffering from the "rumor jitters." While there will be some curtailment, it won't be as great as some of the predictions. Best information today is that appliance production for the months to come will be at 1939 levels. A lot of manufacturers, distributors and dealers made money on appliances in 1939. With greater public purchasing power, with new models confined to better grade merchandise, with many of the trade evils of the past eliminated, including long trade-ins, discount selling and chiseling, these same people can make money again. That is, if they keep their shirts on.

Wire Simplification Please

IF enough people talk, and talk earnestly, about wire simplification perhaps something will be done about the No. 1 problem of the National Electrical Code. There was talk of it at the two annual section meetings of the International Assn. of Electrical Inspectors at San Jose and Tacoma, respectively. More eloquent than talk, though, is the silent non-acceptance of the 1940 new wire tables.

Secretary Tousley of the IAEI plead with inspectors to give the 1940 code a fair trial and learn by experience whether its wire tables are too complicated to be practical. Nothing can now be done about the code until next December before the 1943 edition is ready. The new tables only reflect reality as far as wire performance under load is concerned. Yet nothing is being done to accept them here in the West.

The problem is as complex as the tables appear to be, for it requires action on two fronts. Wire manufacturers must either agree, which would be illegal, or spontaneously decide all to manufacture less kinds of wire and swing gradually to one new, better, thinner, insulation as an all purpose wire. Then the Code could simplify its tables to that wire, ignoring the other varieties that are on their way to elimination.

Tell the Housewife

IN THIS era of price ceilings and wage floors, inflationary waves, pegged prices, luxury taxes, price subsidies and economic heresy, there is one very evident fact: The cost of living is headed upward, maybe skyward. If you don't believe it, ask any housewife. She will give a vivid description of a strained budget in which the same number of dollars fails by a wide margin to buy the same standard of living that it bought a year ago. The U. S. Bureau of Labor cost of living index shows a 6% rise since the war shouting started in this country. Major item in the family budget—food—is up most, 14.4%. Clothing is 2% higher, housing 2.3% and other items up proportionately. And while Mrs. Housewife is declaiming loudly on the inequity and unjustness of the boosts, you can impress her with another salient fact: The cost of gas and electricity is down 1.1%. It's the only item in the family budget that is lower today than a year ago.

TODAY a well-nourished economy is as important in time of crisis as a well-fed soldier. Indeed, if you do not have the one, you are likely not to have the other. I say it from a feeling that the burden of proof should be on those who suggest impulsive changes to demonstrate that the particular changes they demand are necessary. We are today more than an arsenal of democracy; we are its pocketbook. With our mode of living under serious adjustment and strain, it is no time for complicating our problems by needless throwing of monkey wrenches
—Arthur Kudner, Arthur Kudner, Inc.

RMEL Looks to the Future

Public attitude, legal limitations, load development, new problems faced with courage

TROUBLE has toughened the electrical industry and it can look with a courageous eye to whatever the future may bring. Such a conclusion was inevitable to any one of the 150 who attended the Rocky Mountain Electrical League 38th annual convention at Estes Park, Colo., Sept. 11-13, presided over by Gaylord B. Buck, Public Service Co. of Colo., Denver. Focus of the entire convention thought was on the future. And to fortify speakers and the audience with a courageous heritage from the past, each session was opened by the showing of an educational motion picture depicting factually the struggle of the founding leaders to write "The Declaration of Independence," "Our Constitution," "The Bill of Rights" and "The Monroe Doctrine."

Dr. Adam S. Bennion, Utah Power & Light Co., speaking under the title "And a Little Child Shall Lead Them," asked for frank and child*like* thinking, not child*ish*, to meet the three major problems which he saw facing the industry in the future: (1) How to keep solvent despite the pressures of increased costs and taxes on one side, and low rates on the other. (2) The threat of government confiscation of the industry. (3) Adverse public sentiment.

To remedy these influences, he strongly urged (1) better employe training and better service to the public; (2) a better job of telling the industry story; (3) more intimate contact with customers and the trade; (4) enlistment of support from other businesses similarly threatened, and (5) sitting down with the people in each community to discuss with them at close range their mutual status in the issue of enterprise and freedom.

"When the pie (of the future) is opened" said W. A. Cyr, associate editor, ELECTRICAL WEST, "human nature will not have changed and in spite of talk of large scale planning and other grandiose theories for cushioning the after-war shock, the thing to expect from human beings is a reaction against dictation, regimentation, bureaucracy and officiousness. The individual company will do better to make its own practical plans. Most of all," he urged, "keep flexible, keep selling, keep advertising. The minute we stop selling we are sunk. Our way of life, our enterprise system wil go by default. If you value it at all, keep it going. Keep this business—not a government handout."

While nobody has been looking, a very subtle preemption of state and local water rights has been slipped over in the broad new interpretations of just what is a "navigable stream" given by the Supreme Court in recent cases, said L. Ward Bannister, Denver attorney who has fought water problems of that state for years. Unless watched, every use of water, from drinking to power, will come under the jurisdiction of federal regional bureaucrats and local control will be lost.

"Remember, there's a death sentence over this industry" reminded Ashton B. Collins, originator of Reddy Kilowatt. He told the industry it should repackage its story with simplicity, romance and humour in order to reach a fast-moving procession of people, only one out of six of whom even know the name of the company, and all of whom are suspicious of corporations and half think their light rates are too high.

The certificate of merit for the year's outstanding effort was presented at the banquet to Ted M. Foulk, Public Service Company of Colo., for his adequate wiring promotion activities. Tributes were also paid to President Buck and to Secretary-Manager Geo. E. Lewis for his national recognition of the League by the Federal government and the U. S. Chamber of Commerce.

L. A. S. Woods, Westinghouse Electric & Mfg. Co., Cleveland, under a title "There Shall be no Night" said that when the emergency has passed, surplus power loads can well be absorbed in street and highway lighting.

TWO BENNIONS

Reddy Kilowatt's Ash Collins and President Gaylord B. Buck

While impossible to light highways to equal daylight intensity, it is possible to "paint the roads white with light so that objects can be seen against them." He placed the responsibility on utilities to convince cities that it is "not what a city believes it can afford for lighting, but what it really costs to protect its citizens."

Denver has a public official fully acquainted with the street lighting problem in Geo. Crammer, manager of parks and improvements, who talked next. Discussing the usual attitude as one of concern over appearance of poles rather than visibility, he said the standards that city officials have to apply is "what do we get for our money." In analyzing Denver's street lighting costs, he had found that small lamps cost $1 per 45 lumens whereas the large 16,000 lumen mercury lamps delivered 178 lumens per $1.00. The industry's responsibility to show such facts was being neglected, he said.

Kinsey M. Robinson, president Washington Water Power Co., Spokane, Wash., scheduled to speak on "It Can Happen to You," was unable to come. Instead John E. Loiseau, Public Service Co. of Colo., headed the Friday afternoon session. While the country is engaged in defending democracy, business, a democratic institution in a democratic country, he said is in the position of having also to defend itself as though it were an alien. He called attention to the tremendous increases in governmental staff and organization —field forces to engage in socialization of industry—and declared that in spite of the temptation to reduce staff to cut expenses, in the future utilities must enlarge their organizations instead to equal the forces aligned against them. He likewise touched on many of the practical aspects of the industry's relation to such subjects as national defense, increased prices for materials, credit restrictions, labor costs, loss of valuable employees to the army or to defense industries, distortion of load need—prosperity among some communities

and depression others — protection against sabotage, problems of raising new capital and increased taxes.

F. D. Grassy, of the Federal Bureau of Investigation, Denver, spoke on the ways in which citizens and industries may assist the FBI in protecting properties or utilities vital to defense from sabotage and fifth column activities.

President Buck's inspirational address "On the Beam" was changed from the Thursday to the Friday afternoon session. Summarizing the speakers before him, he dcelared that all had left a note of courage and a feeling that "this is still a good business and it has a future." The approach to the future, he said, should be "why would they want to take this business? If it is in a mess, who put it in a mess?" Then he challenged those in the industry whether they were working merely for wages or to develop a better way of life for those who come after. The compensation, he said, should be the opportunity to expand and express oneself, a chance to grow, the well-being of fellowmen and an everyday realization of building a bridge between now and tomorrow.

"Gentlemen," he concluded, "You are going to run the public utility business the way the public wants it run or you won't have a business. I don't mean there won't be any business. I mean that they will get rid of you. Nobody can take it out of your hands if you do right by it. It will go into other hands unless you do what is best for the good of the whole country."

Meanwhile, Friday afternoon the ladies had a special program prepared by Mildred Quist, chairman of the League's women's division, and Ruth Kraft, women's chairman for the convention committee. Dr. George W. Allison, the Modern Kitchen Bureau, New York, spoke briefly introducing the new MKB moving picture in color "It Happened In the Kitchen."

"Food for Defense" was the subject of Dr. Allison's talk to the Saturday session. "Food for thought" possibly would have been more appropriate for he, too, spoke encouraging philosophy that (1) there is a *right* way, (2) that one does not have to create that right way, it already exists and all one has to do is to discover it, (3) the right way is always the best way and (4) the right way cannot fail. He then went on to say that "I do know that we have to sell our stuff."

Quietly, with incisive penetration, Maj. H. S. Bennion, managing director, Edison Electric Institute, New York, brought to play upon many of the future prospects of the industry his analytical mind and his 20 years of experience in the Army Engineering Corps. The munitions program, he said, should reach its crest by mid-summer of next year because of the economic limits of materials, labor, transportation, etc. He was inclined to believe the estimates for needs for raw materials were exaggerated. He discussed various proposed federal projects and interconnected networks in a realistic manner. On priorities he predicted they would be a dead issue by next summer with tremendous surpluses of materials on hand.

On commercial programs, he advocated more selective selling and going after the kind of business companies will need after the emergency is over. With an election next year, he looked for the brakes on "business as usual" to be removed. Cautiously he advanced the idea that the greatest emergency facing the nation will be 10 to 15 years from now as an aftermath of the war, a subsequent boom, and a deep depression which will bring forth loud demand for public works to "cushion the shock," which he said would mean "pour out the gravy." Finally, he emphasized the need not only to "tell the public" but to watch performance.

President-elect J. W. Alexander

People, 80% of whom think they are poor, judge a company by appearances rather than facts.

At the election of officers following the conclusion of the convention, J. W. Alexander, Rawlins Electric Co., Rawlins, Wyo., was elected president; W. D. Johnston, Mountain States Power Co., Casper, Wyo., vice president for Wyoming; T. M. Foulk, Public Service Co. of Colo., Denver, vice president for Colorado; M. C. Heffleman, Deming Ice and Electric Co., Deming, N. M., vice president for New Mexico; Homer A. Fluckey, Mine & Smelter Supply Co., Denver, vice president for distributors; W. D. Stearne, Arvada Electric Co., was re-elected treasurer and Harry Adler, same company, assistant treasurer. George Lewis was re-elected secretary-manager.

Convention committee was headed by T. M. Foulk with Ruth Kraft as women's chairman and Harry Adler as entertainment chairman.

Sandwiched in between sessions on Thursday, the newly created Rocky Mountain Chapter of the Illuminating Engineering Society was presented its charter from the national IES by James M. Ketch, General Electric Co. Lamp Department, Cleveland, Ohio, and a member of the executive council. R. N. Hankins, Albert Sechrist Mfg. Co., Denver, and chairman of the chapter presented a charter membership in the chapter to Ketch. The new chapter was given a gavel by the Hartford, Conn., chapter, the newest chapter just preceeding the entry of the Rocky Mountain unit into IES.

Proposed program for the year includes 5 meetings, the first of which will be in October. Next meeting is to tie in with the RMEL mid-winter conference in January, with two more meetings before summertime, one of which will be a social meeting or picnic.

Northwest Inspectors Go to Work

Code articles disected, wire and fuse problems discussed, outside viewpoints heard at meeting

A "WORKING" convention, featuring several recommended revisions of the 1940 National Electrical Code, was the 15th annual meeting of the Northwestern Section, IAEI, at Tacoma, Sept. 2-5. I. B. Sturges, Portland electrical inspector, and president during the past year, pushed along the crowded program to completion and found time to permit the delegates to enjoy a variety of entertainment provided by the local committee headed by W. L. Gaffney, electrical inspector, Tacoma, who, at the last session, was elevated to the presidency of the Northwestern Section for the coming year.

Besides reports of Article committees and special committees of the section, the program contained valuable discussions on related subjects. Robert Shepard, Underwriters' Laboratories, New York, outlined the relations between the Laboratories and the electrical inspectors, pointing out where coopera-

tion between these groups was necessary in the best interests of each group. "Electrical safeguards against loss of life and property by fire." was the subject of an address by Herbert G. Ufer of Underwriters' Laboratories in Los Angeles. J. J. Sidall, H. H. Robertson Co., Pittsburgh, gave an illustrated talk explaining the cellular metal floor raceway manufactured by his company. A sound picture, "Harnessing a Giant with Insulation," illustrating the part played by porcelain in electrical safety, was shown by E. G. Romeiser, Porcelain Products, Inc., Union City, Ind.

A studious explanation of voltage drop and how to figure it in various types of circuits was delivered by Arthur L. Abbott, NEMA, New York, while G. A. Sawin of that organization discussed the trend in state legislation for regulation of electrical work, with many an example of good and bad legislation.

Speaking on the subject, "Wiring Methods in the National Emergency," Howard H. Weber, U. S. Rubber Co., New York, analyzed the confusion existing on account of the present Code rules covering rubber-covered wire and suggested a three-way solution: (1) Keep present type R until lack of use renders it extinct; (2) Insert new light-wall type R to meet the same requirements as present type R in branch circuit sizes; and (3) Permit lighter wall type RU in all branch circuit sizes for all-purpose wiring.

Among major Code changes recommended by Article committee was a proposal to re-write Sections 2121 to 2175 of the NEC on branch circuits in ten new sections. It was recommended in the report of the Article 210 Committee by L. W. Going, chief electrical inspector, Portland, "to put the rules in a more simplified form better suited to the Code users." The proposal was approved.

S. B. Clark, Northwestern Electric Co., Portland, chairman of the Article 450 Committee, reported a proposal to reaarrange the rules covering transformers and vaults to give more detailed information to inspectors. This recommendation was approved. The Article 730 Committee, headed by V. B. Wilfley, Westinghouse, Seattle, recommended that this article, covering outside wiring, be reviewed by the electrical committee with a view to making the rules as clear and concise as possible. Many other minor changes were recommended in the various Article committee reports, but in general the 1940 Edition of the Code met favor with the Northwestern Section. Recommendations received from the North Carolina chapter opposing the continued use of the clamp type switch and

TOUSLEY SHEPARD

¾-in. outlet box were concurred in by the convention.

Among the reports of special committes that by Capt. Stephen E. Sanislo of the Seattle Fire Dept. on fire and accident prevention and investigation of electrical fires aroused considerable enthusiasm. The importance of this committee work was emphasized by Captain Sanislo and an urgent request to report electrical fires to his committee was reiterated.

Captain Sanislo also reported as chairman of the Northwestern Section Public Relations Committee, citing many ways in which inspectors could fulfill their responsibilities as educators of the public on electrical safety. The report of the International committee on this subject by J. W. Whittington, chairman, New York, took the form of a radio program written specifically for presentation over a Tacoma station during the convention. In it, use was made of the record produced by the International Committee, though much of it took the form of dialogue between the announcer and I. B. Sturges and W. L. Gaffney.

The part to be played by the inspector and electrical contractor in the national defense emergency was discussed at some length by G. E. Kimball, San Francisco, in his report as International president. He also point out that proposals to revise the 1940 Edition of the NEC should be prepared well in advance, outlined the form and contents of the National Electrical Safety Code, cited the local chapters of the association as being the best means of transmitting detailed Code information and interpretation, and outlined the work of several special committees of the International association. I. B. Sturges, president, and Fred D. Weber, secretary-treasurer of the Northwestern Section, indicated by their reports the healthy condition of the organization. The Montana, Utah and Puget Sound chapters also entered official reports.

ARTHUR and MRS. ABBOTT

The IBEW was represented by several local members as well as by M. H. Hedges, head of the research department in Washington, D.C. Mr. Hedges brought greetings of the organization and a pledge of cooperation in keeping standards up in the face of the difficulties created by the national emergency. E. S. McConnell, Edison Electric Institute, New York, also brought the greetings of his organization along with a brief analysis of benefits to be derived by building owners, manufacturers, contractors and inspectors from the use of small diameter wires as now allowed in the 1940 Code.

Two Code breakfasts, presided over respectively by A. J. Newton, chief electrical inspector, state of Washington, and E. E. Lee, chief electrical inspector of Seattle, took up the question of priorities and the substitution of materials, and the question of protecting industrial plant buildings in the installation of transformers, all these questions having been raised by the national defense emergency.

Other officers elected beside W. L. Gaffney to be president, were as follows: first vice president, W. R. Volheye, chief state inspector for Oregon; second vice president, J. H. Stayner, Utah Power & Light Co., Salt Lake City; secretary-treasurer, F. D. Weber, Oregon Insurance Rating Bureau, Portland. L. W. Going was again named to represent the Northwestern section on the Executive Council, while Weber and Going were re-elected the section's representative and alternate respectively on the Electrical Committee, NFPA. Members of the executive committee, in addition to the officers, are to be C. H. Lyness, Vancouver, Wash.; H. E. Chambliss, Montana Power Co., Great Falls; R. A. Walker, Seattle; and W. I. Downie, Trumbull Electric Co., Seattle. Portland was chosen as the next meeting place.

Among the entertainment features were a clam bake at Point Defiance Park on Puget Sound near Tacoma, the annual dinner dance, inspection of Walt Sutter's (of Tacoma) display of Chinese art, and the annual golf tournament, in which P. S. Linscott, Seattle, carried off the Inspectors' Cup, while Thomas P. Window, Port Angeles, won the Harry B. Kirkland cup.

PCEA *Panorama* — *Edited by Mary Shoop*

Joint Fall Conclave Set For Fresno

All-membership meeting to offer full interchange of ideas; guidance committees enthusiastic over program possibilities

MEETING for the first time in a joint fall conclave, PCEA men and women from all parts of membership territory will assemble in Fresno on Thursday and Friday, Nov. 6 and 7. The conclave for the Business Development and Administrative Services sections will be held at the Hotel Californian, while the Operating Economics Section will meet at the Hotel Fresno.

A wider interchange of ideas is expected from the combination of the two conclaves which in the past have been held in the northern and southern parts of California. Because of the increased value anticipated from the meetings, the guidance committees of the three sections are giving more than their usual enthusiastic attention to planning the programs, and interest being evidenced throughout the entire membership is expected to bring a large attendance.

The conclave will be honored by the presence of C. W. Kellogg, president of the Edison Electric Institute, New York, who will speak at luncheon on Friday.

Davis DeBard, vice president of Stone & Webster Engineering Corp., New York, has been invited to appear on the Thursday luncheon program. Mr. DeBard has been in continuous correspondence with men of English utility companies concerned with maintaining service in bombed areas.

The program will be outlined in detail in an announcement to reach every member several weeks before the conclave. Meetings will be devoted almost exclusively to informal round table discussions, where everyone has an opportunity to express his views and introduce any desired subject, rather than more formal sessions with the audience listening to prepared papers.

A program of general interest to the Business Development and Administrative Services sections will close their conclave on Friday afternoon. This will be the only period during the two days not devoted to general discussion.

The social side of the conclave will be taken care of at a party and dance on Thursday night. The Power Club, employees' organization of the San Joaquin power division, PG & E, Fresno, will be hosts to all delegates at the Power Building auditorium.

The Operating Economics Section conclave, first set for Nov. 4 and 5, was changed to Nov. 6 and 7, due to a San Francisco election on one of the original dates. This section will hold a separate conclave from the other two sections, joining them only at the luncheons.

Conclave Program

Because program committees had held only preliminary meetings as this issue went to press, complete details of the program were not available. The general schedule is:

BUSINESS DEVELOPEMENT SECTION

Thursday morning and afternoon — discussion under the following group headings and sponsors:

Wiring, A. B. Smedley
Code and ordinance
Promotional programs
Lighting, Milo Cain
Domestic
Industrial and commercial
Fluorescent
Ranges and Water Heaters, H. H. Fogwell
Traffic Appliances, M. G. Sues
Power, P. P. Pine
Industrial and Commercial
Agricultural

Friday morning—joint session with the administrative services section.

The following talks will be presented:
"Copper and Kilowatts." A. B. Smedley
"Taxation," Lane D. Webber
"Agriculture and the Defense Program," Prof. H. B. Walker, University of California, Davis.
"Priorities," H. H. Wright, Los Angeles Chamber of Commerce.

Friday afternoon—panel discussion on personnel, featuring three phases of employee training:

Training for increased sales
Training for increased service
Training for personal advancement

ADMINISTRATIVE SERVICES SECTION

Thursday morning and afternoon—discussions under the following group headings and sponsors:

Accounting, F. C. McLaughlin
Credits and Collections—Chas. Davies
Customer Relations—R. R. Walbridge
Fiannce—E. J. Beckett
Personnel—L. J. Nevraumont
Purchasing and Stores—Wm. DeWaard
Women's Committee—E. A. Long

Friday morning and afternoon—joint meeting with the business development section. See program above

OPERATING ECONOMICS SECTION

Thursday morning—general assembly, Theme "Interconnected Operation of California Utilities." Discussion leader, N. B. Hinson
A number of prominent speakers will discuss the technical operating problems associated with interconnection and the part it plays in national defense.

Thursday afternoon and all day Friday—individual discussions under the following group headings and sponsors:

Accident Prevention—H. H. Buell
Transmission and Distribution—J. P. Jollyman
Meters—O. A. Gustafson
Steam Generation—E. W. Morris
Hydro Generation—A. C. Schwager
Transportation—F. D. Beardsley
Substation and Apparatus—L. J. Moore

An inspection trip to Friant Dam is being considered for Saturday.

Electriquiz

Charles L. Huyck, Graybar Electric Co., San Francisco, prepared this interesting true or false quiz. The answers are on page 82.

1. Electric surface cars are the most popular form of electric transportation in cities.
2. A "49-er" is a term applied only to one who came to California during the gold rush of 1849.
3. The numbers 186,300, 746 and 3412 are useful for electrical men to remember.
4. Individuals, as well as economic groups, should never head for a depression.
5. It is best to stay in your car during a thunderstorm in the mountains.
6. A Red Seal wiring certificate is awarded to the owner of a new home to show him that his home has gone as far as it can electrically.
7. Yellow lamps repel insects on the porch or at the barbecue.
8. The janitor who leaves a vacuum cleaner on the stage during a symphony concert should be fired.
9. The almost incredible quantity of 5,000,000 fluorescent Mazda lamps are expected to be sold in the United States this year.
10. The Mississippi River is the dividing letter between the radio call initials W for eastern and K for western.

Information, Please

Our own quiz show, with members asking questions about the industry of a board of experts, is highlighting the PCEA district meetings being held this month in 14 cities. Many PCEA directors are numbered on the forum card, which at each meeting includes a manufacturer, wholesaler, contractor and utility company representative. V. W. Hartley, association managing director and secretary, presides.

Latest developments of that fast-growing industry child, fluorescent lighting, are discussed on the program by C. E. Weitz, prominent G-E lamp department engineer from Nela Park. Industry conditions as affected by national and world events are reviewed by President G. C. Tenney.

The schedule for the meetings is:

Reno, Sept. 29, Lawton Springs; Chico, Sept. 30, Chico Art Club, Sonoma, Oct. 1, Mission Inn; Sacramento, Oct. 2, Elks Club; San Jose, Oct. 3, Hotel Sainte Claire.

Watsonville, Oct. 6, Hotel Resetar; Fresno, Oct. 7, Hotel Californian; Bakersfield, Oct. 8, Motel Inn; Santa Barbara, Oct. 10, Elks Club.

Santa Ana, Oct. 13, Masonic Building; San Diego, Oct. 14, Hotel San Diego; Alhambra, Oct. 15; Santa Monica, Oct. 16; San Bernardino, Oct. 17, California Hotel.

WHO AM I?

I was born in Alameda, Calif., on June 8, 1898. My early education was received at St. Matthew's School, Burlingame, and at Columbia Prep School in Washington, D.C. I was graduated from the United States Military Academy at West Point and served with the A.E.F. in Siberia. Who am I?

From 1920 to 1923 I was special agent for the Pacific Mail Steamship Co. in Central America. In 1924 I joined the Okonite Co. in San Francisco as sales representative, and have been Pacific coast manager since 1927. Who am I?

I am a director of the Pacific Coast Electrical Association and a director of the San Francisco Electric Club. I am a trustee of the town of Ross, where I reside with my wife and daughter. I am a member of Marin Lodge 191 F. & A.M., American Legion, Commercial Club and 32nd degree, San Francisco Bodies Scottish Rite, as well as the Engineers Club of San Francisco, California Golf Club, Meadow Club of Tamalpais and Veterans of A.E.F., Siberia. Who am I? Ans. 82.

Business First

Taxes, labor problems, priorities fare of NEWA Pacific Division

A program organized in such a way as to produce the most from a solid business standpoint was presented to the Pacific Division, National Electrical Wholesalers Assn., by Dave Smith, of Graham Reynolds Co., Los Angeles, its president, when it met for its fall session at Del Monte, Calif., Aug. 28-30. Taxes, labor problems, priorities were heavy fare, with a relaxation diet of golf, a cocktail party and the customary golf stag dinner Saturday night.

F. A. Pike, tax counsellor, Los Angeles, in tracing taxation changes cautioned that the amendment to the constitution which had authorized the Federal government to tax the income of both business and the individual had changed the entire structure of taxation. Prior to it, when a man earned a dollar, it was his dollar. Now when a man earns a dollar the government says that only a certain percent of that dollar can remain in his hands. This fundamental change in government has not yet been given its maximum application, Pike said, but is likely to have it under the new defense burdens.

At the same Friday morning meeting, A. E. Roth, president, Employers Council, San Francisco, one of the ablest labor counsellors in the West, talked on present day management and labor relationships. While he reviewed progress made in labor relations recently he made clear several conditions in the present situation which have inherent labor difficulties which work against the interests of both management and labor. Informal discussion of the subject was one of the valuable by-products of the address.

Graham Holabird, district manager, National Electric Products Corp., Los Angeles, opened the Saturday morning general meeting with a full report on the meeting, the week previous, of the Southwestern Section, International Assn. of Electrical Inspectors, at San Jose. He covered phases of the meeting and actions taken which were pertinent to the business interests of the wholesaler and manufacturer.

G. Howard Hutchins, district manager, priorities division of OPM in Los Angeles, talked on "Arranging to best serve the consumer while building an adequate national defense." He outlined the complete priority structure at Washington, then discussed the particular phases affecting wholesalers and manufacturers. His remarks stimulated many questions whose answers helped to clarify the situation in many respects.

Golf tournaments, Friday and Saturday afternoons, brought the following cups to reward these players: Manufacturers' cup, Louis J. Kerlin, San Francisco district sales manager, National Carbon Co. Clendenen trophy, G. M. Kempf, district manager, Thomas & Betts Co., Los Angeles. The Copper Cup, R. A. Balzari, executive secretary, Pacific Division, NEWA. The central station cup was not in play at this meeting. William Jewell, San Francisco district manager, Westinghouse Electric Supply Co., presided as toastmaster at the golf banquet. The San Francisco Ben Franklin Club was host at the cocktail party.

Meetings

Electric Club of San Diego joined other San Diego service clubs for the first annual joint meeting, Sept. 16, at which Frederick P. Woellner, UCLA spoke on "The American Way of Life." The meeting was held outdoors at the organ pavillion in Balboa Park.

Electric Club of Washington heard Ralph Dorsey, traffic engineer,, Street Traffic Engineering Bureau, City of Los Angeles, and an outstanding advocate of safety lighting, at its Sept. 22 meeting. Officers were elected at the Sept. 15 meeting.

Electric Club of Los Angeles opened the fall season Sept. 15 with a talk by waterfront reporter Arthur Ponsford, followed by an oil industry day over which R. C. McFadden, Edison Co. presided. J. H. Pengilly of Square D Co. is president. Committee chairmen for the year announced by him are: *attendance*, C. P. Garman; *auditing and finance*, K. L. Sinclair; *civic and inter-club relations*, Dean T. Smith; *fellowship*, Herbert H. Cox; *March of Electrical Time*, Randolph Karr; *membership*, H. W. Tice; *program*, A. D. Brown; *public policy*, S. E. Gates; *publicity*, Walter L. Stickel; with C. R. E. Germaine, vice chairman; *special events*, Wm. R. Frampton; *sports* C. A. Purviance with L. W. Howard, vice chairman; and *visiting and relief*, David Hall with C. H. Talmadge, vice chairman.

East Bay Electric Club, Oakland, started its fall season Sept. 15 with new president Ben Hill, Jr., Electrical Products Corp., Oakland. Secretary-treasurer is W. T. Trounce, Pacific Telephone & Telegraph Co. Walter Lynn, Pacific Gas and Electric Co., chairman of program committee, and Al Fragley, P T & T chairman of membership and attendance.

The Electric Club of Washington's monthly paper, formerly called "Bulletin," has changed its name to "Luminar," after a contest was held to provide a new name. The masthead, featuring the name, was designed by Frank Swearingen of the advertising department of the Puget Sound Power & Light Co., following a suggested sketch of Architect Fred Stephen, who won the prize for selecting "Luminar".

IES, Southern California Section, held its first fall meeting at the Elks Club Sept. 12. It was the annual stag.

NEWS of the industry

PG AND E TO BUILD TWO NEW STEAM PLANTS

Two new 60,000-kw. steam plants to be erected on the Pacific Gas and Electric system are being designed by Stone & Webster Engineering Corp. One plant is to be located adjacent to the present Midway steam plant in Kern County in the lower end of the San Joaquin Valley and the second on one of several sites now under consideration. Each station will cost approximately $7,480,000.

The two turbo-generators will be the largest on the PG and E system and have been ordered from the General Electric Co. Each will be rated at 75,000 kva., 60,000 kw. at 0.8 pf., 1,800 rpm., 12,000 volts. Turbine pressure is 1,350 lb. Radiant type boilers rated at 450,000 lb. of steam per hour have been ordered from Babcock & Wilcox. Foster Wheeler will furnish the condensers. Forced air cooling towers will be used at Midway where cooling water is limited to local well sources. Because the Midway plant will be located in the heart of the Kern County oil and gas fields, the boilers will be equipped to burn either fuel.

Both stations will be built under the supervision of the PG and E construction department. Midway is scheduled for operation in November, 1943.

Meanwhile the present 25,000-kva. Midway plant, built in 1921, is being overhauled at a cost of $48,577. Also planned as a part of this program is a 60-mile, 70-kv. line from Midway to San Luis Obispo, costing $727,000. This line will make available 25,000 hp. additional energy to the defense projects in the coastal area.

Pacific Gas and Electric now has a 700,000-hp. construction program under way which will increase its system capacity 37% between 1941 and 1944, to a total of 2,600,000 hp. under normal water conditions.

● CONGRESS has been asked for upwards of $12,000,000 in additional appropriations for government power projects in the West. Included is $6,000,000 for three more Grand Coulee generators, $3,000,000 for starting a 220-kv. transmission line from Shasta Dam to Antioch, Calif., and $1,750,000 for another unit at Boulder Dam.

● CONTRACT for $403,300 of structural steel for the Harbor Steam Plant has been let to the Bethlehem Steel Co. by the Los Angeles Bureau of Power & Light. So that the plant may be completed before the Fall of 1942, it has been assigned an A-2 priority.

MWD PROPOSES TO SELL SURPLUS BOULDER POWER

Negotiations to dispose temporarily of a portion of the Boulder Dam power output contracted for by the Metropolitan Water District have been started in Washington by officials of the MWD. Under terms of a contract drawn before work started on Boulder Dam, the district is obligated to take 36% of the total power output.

It will be several years before pumping requirements along the Colorado River Aqueduct will raise power demand to the contract amount, district officials state. In the meantime, the district would have to purchase upwards of $100,000 in power monthly for which it has no need. One suggestion made is that the MWD power be turned over to the $63,000,000 magnesium plant to be erected at Las Vegas, Nev. Power requirements of this new metals installation would approximate 200,000 kw.

Whatever disposition is made of the present MWD excess power will require government approval under the terms of the original contract.

Unit No. 5 Goes on the Line At Bonneville Sept. 8

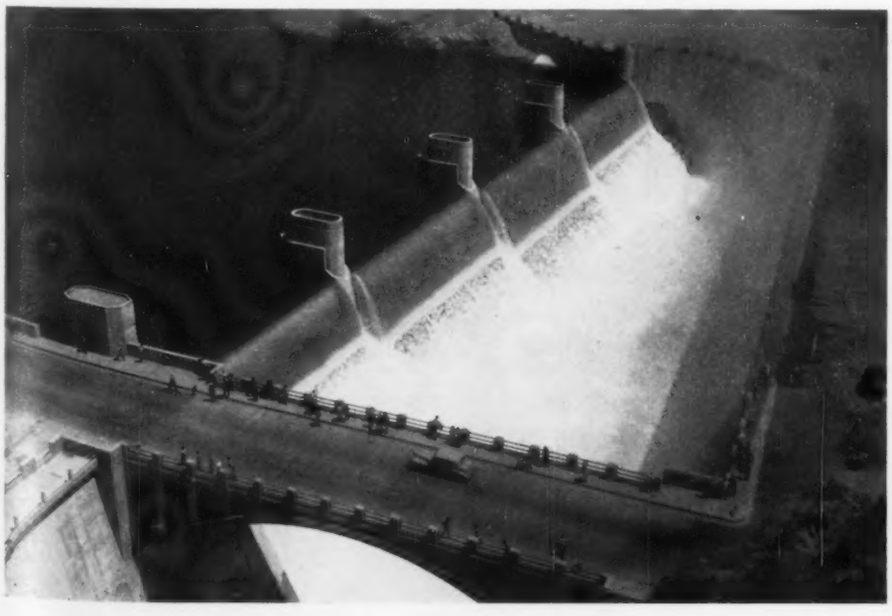
Bonneville powerhouse had a total generating capacity of 248,400 kw. on Sept. 8 when unit No. 5 was reported as ready for continuous service by the U. S. Army Engineers who are in charge of construction and operatioin of the dam. Unit No. 5 is rated at 54,000 kw. A similar unit now under construction will be ready for operation in January, 1942.

In the meantime excavation for the powerhouse extension to house units No. 7-10 is almost completed and work on the concrete and steel structure will start soon. These last four units are scheduled for operation in 1943.

Total combined capacity of the Bonneville-Coulee plants is 268,400 kw. at present with the initial 108,000-kw. main Coulee generator set for operation some time in October. Bonneville's September power deliveries totaled 239,700 kw.

● RECONSTRUCTION OF the Gold Ray hydroelectric dam on the Rogue River in southern Oregon will be completed by the California-Oregon Power Co. before the end of October.

This is what happens when Boulder Dam brings the largest artificial reservoir ever created by man up to its full capacity. When the Arizona floodgates were lowered in the picture below, the reservoir contained 31,000,000 acre-ft. of water. Storage began behind the dam in February, 1935. Heretofore the maximum storage was 25,500,000 acre-ft., which was impounded in July 1939. At the time this picture was taken Lake Mead extended 119.4 miles up th Colorado River



Ross Dam Project Cooperation Assured

Cooperation of the governments of Canada, British Columbia and the United States in a plan to increase the height of Seattle City Light's Ross Dam on the Skagit River appeared assured at a recent hearing before an international joint commission in Seattle. Prior to adjournment, it was stated the commission will meet in Ottawa October 8 at which time an order will be issued announcing either approval or disapproval of the application.

At the hearing George H. Moore, City Light senior engineer, testified that adding 345 ft. to bring Ross Dam to its ultimate height will flood 5,475 acres in Canada. He said that City Light had purchased all private property in the basin across the international boundary and all that remains to be acquired is a tract of 640 acres of crown land owned by British Columbia. Eugene I. Pease, senior United States engineer, said the higher elevation will be a great aid in flood control and would almost entirely eliminate seasonal high water in the lower river.

E. R. Hoffman, superintendent of City Light, asked a speedy decision on the matter, declaring it may be necessary to begin work earlier than planned in order to supply adequate power for new national defense industries.

● ESTIMATES of private utilities of future defense power demands are held to be inadequate by the FPC in its current report on power requirements and supply. The report calls attention to a 20% increase in kilowatt-hour requirements and a 13% increase in peak demands for June, 1941, over June, 1940. The FPC asserts that orders should be placed immediately for new generating units to be placed in operation in 1943 and 1944.

● MEMBERS of the St. Lawrence waterways advisory commission, composed of representatives of both the U. S. and Canada, inspected the Bonneville and Grand Coulee projects last month. In the party were representatives of the U. S. Corps of Engineers, the FPC, the New York State Power Authority and the Ontario Hydroelectric Commission.

Grays Harbor PUD Protests Bonneville Power Sales Tax

Grays Harbor PUD commissioners at a recent session voted to protest payment to the State of Washington the two percent sales tax on energy which it sold to Bonneville during the summer. Bonneville, it was explained refused to pay the tax when it was added to the PUD bill. The state tax commission, however, notified the PUD the sum must be paid the state by the PUD and now, it is stated, unless the PUD can collect from Bonneville, which appears unlikely, it is said, the district will have to pay the tax itself.

It is pointed out that if the federal government refuses to pay the state tax to the PUD other governmental agencies also may refuse to pay it and this may leave the PUD liable for all sales taxes which the various governmental users of PUD power refuse to pay.

Sterilamp ultraviolet rays (Westinghouse), of wavelength deadly to mold and bacteria, protects Irwin Memorial Blood Bank of San Francisco Medical Society

Anger Named President Electric Club of Washington

Harry Anger, Seattle branch manager of the Puget Sound Power & Light Co., has been named president of the Electric Club of Washington succeeding Norman L. Bost, Seattle representative of the National Electric Products Corp. He was inducted into office Sept. 22, a week following his election. Other executive officers of the statewide organization include: George M. Boyd, Westinghouse Electric & Manufacturing Co., first vice-president, succeeding T. M. Widrig, of the Trumbull Electric Manufacturing Co., and E. A. Will, of Allied Industries, second vice-president, succeeding Bert Cole, of Graybar Electric Co., Inc.

C. W. Allison and R. A. Walker, Puget Sound Power & Light Co., were renamed treasurer and secretary, respectively. New trustees named include: James Ferguson, Seattle City Light; S. G. Hepler, of the Arrow Electric Co. and C. D. Reis, of Westinghouse Electric & Manufacturing Co.

Newly-elected President Anger has for years past served as the Electric Club's entertainment chairman. He has also served on the board of trustees.

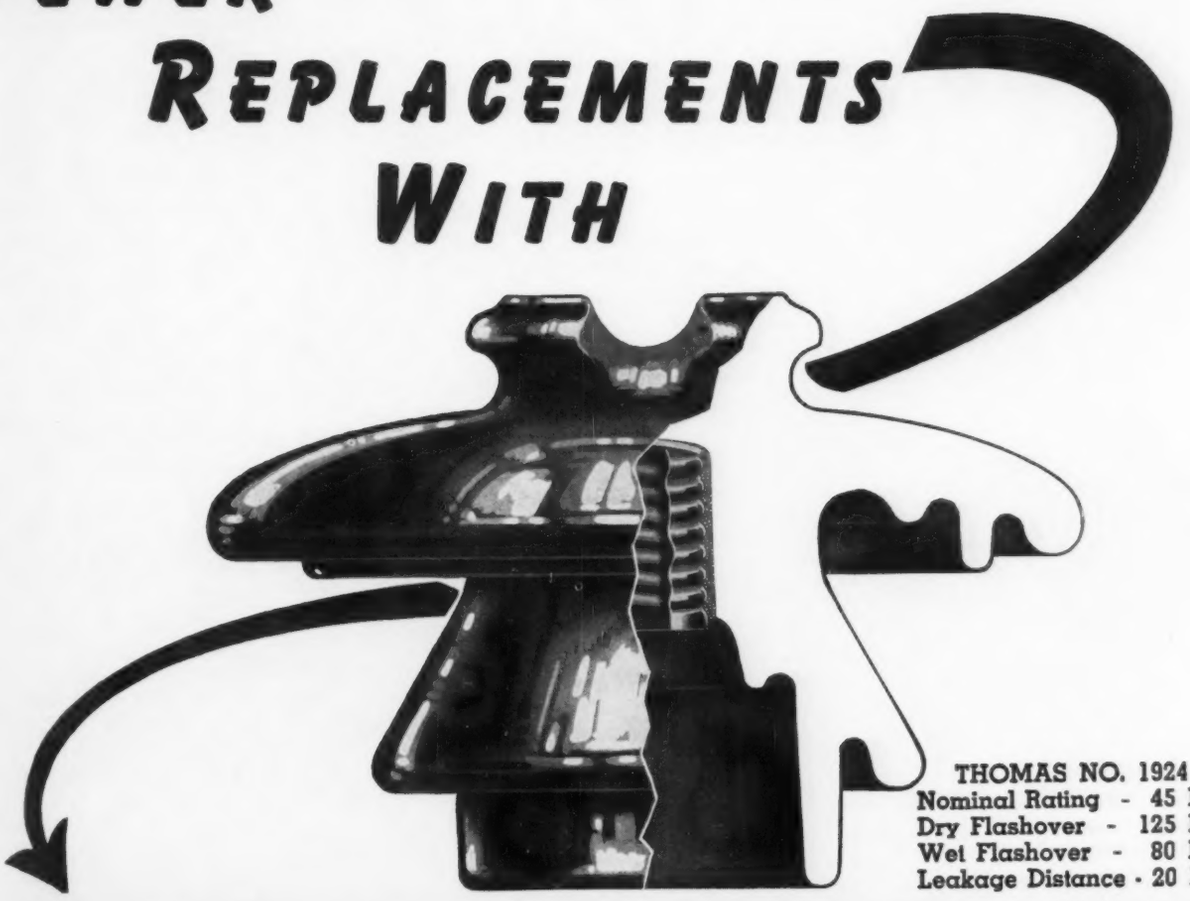
● PROPOSED 1942 budget calling for expenditures totaling $1,787.000 is being studied by the Grays Harbor, Wash., PUD commissioners and a public hearing in Aberdeen was held for October 6. In a contingent budget, the commissioners propose buying the Puget Sound Power & Light Co.'s holdings in Eastern Grays Harbor county for $625,000, building 29 rural extensions at a cost of $140,000 and constructing a new office building to cost $25,000.

● CITY COUNCIL of Tacoma, Wash., has passed an ordinance appropriating $300,000 from the city lighting funds to pay part of construction costs of the proposed Nisqually power project and authorizing the corporation counsel to purchase or condemn needed property.

● WYOMING Public Service Commission is studying the possibility of a reduction of power rates for customers of the Utah Power & Light Co. in Evanston and Green River. The new rate schedule would result in annual savings in Evanston of $4269 and users in Green River amounting to $2743.

● SEATTLE CITY COUNCIL has passed ordinance appropriating $40,000 to give employees of City Light's operating division wage increases averaging 10%. This increase brings salaries to the level of those paid by other Northwest power utilities.

FEWER REPLACEMENTS WITH



THOMAS NO. 1924
Nominal Rating - 45 Kv.
Dry Flashover - 125 Kv.
Wet Flashover - 80 Kv.
Leakage Distance - 20 In.

THOMAS "QUIET-TYPE" INSULATORS

● Here's an insulator of one-piece porcelain construction incorporating the feature of a thick, central, porcelain mass surrounding the pin. This type is carefully designed to give our insulator a sturdy ruggedness without sacrificing desirable thermal, leakage, and flashover characteristics. Performance tests prove the heavy design exceptionally advantageous in areas where stone throwing or shooting is prevalent. Because missiles or bullets glance off its rugged skirts without breaking the porcelain, there are fewer replacements from malicious damage.

● In addition to minimizing losses from rough handling or breakage on the line, Thomas #1924 units have proven their economy in many other ways on thousands of miles of 33 Kv. lines. Because mechanical, thermal, and electrical characteristics are so well balanced, these insulators have greater stamina under unusual operating conditions to which they are subjected at times in severe service. Abusive operating conditions or destructive power arcs are seldom found too severe to hinder the unexcelled performance of Thomas #1924 units.

● The patented under-glaze "Thomas Process" for the positive elimination of insulator radio-noise and a built-in permanent feature of all Thomas "Quiet-Type" Insulators is available in all Pin Types. For your next 33 Kv. line, specify Thomas #1924 "Q-T". They'll cost you less in the long run.

OUR LATEST CATALOG

complete with up-to-date designs, illustrations, and engineering information on all items, is yours for the asking. If not received write for your copy today. . . . .

THE R. THOMAS & SONS COMPANY

ENGINEERS MANUFACTURERS DESIGNERS

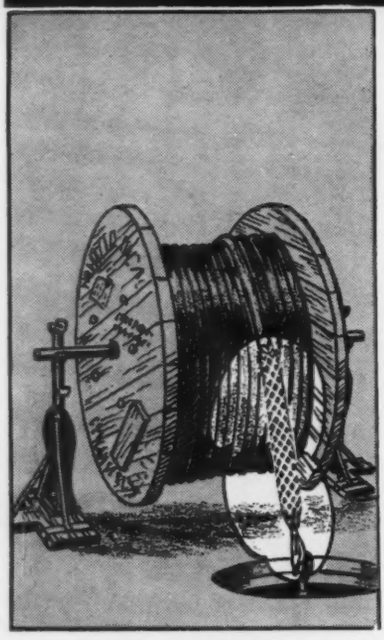
LISBON, OHIO, U.S.A.

OUR 68TH YEAR

REPRESENTATIVES:

LOS ANGELES	SAN FRANCISCO	SEATTLE	PHOENIX
Farnham & Cunningham	George E. Honn Co.	Ken H. Best	J. E. Redmond Co.
628 Edison Bldg.	420 Market St.	222 9th Ave.. North	448 W. Madison St.

modernize
YOUR
DISTRIBUTION
PRACTICE—



RELIABLE
CABLE GRIPS

Grips for Pulling
Underground or
Aerial Cable

"COMPARE
THE
WEAR"

Carefully engineered details and fine workmanship result in extra wearing quality as wires pull with evenly distributed load.

Eight different styles—all supplied in a full range of sizes.

Reliable
ELECTRIC COMPANY
OVER 30 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE - CHICAGO ILLINOIS

UTILITIES GET A-10 PRIORITY RATING

An A-10 priority rating for public utilities for maintenance and repair materials and operating supplies vitally needed for defense and essential public services was issued Sept. 17 by Donald M. Nelson of SPAB. The order was separate from an earlier one dealing with a number of essential manufacturing industries.

Subject to some limitations, the A-10 rating can be used by the utility or the supplier to obtain three classes of materials:

1. Maintenance material needed for the upkeep of property and equipment in sound condition.

2. Repair material needed for restoration of property and equipment to sound condition after wear and tear, damage, destruction or the like.

3. Operating supplies — material essential to the operation of the utility involved and which is generally carried in the company's stores and charged to operating expenses.

New improvements, new plant or expansion of the service area of the utility are not covered by the present order. Where definite defense projects are involved, it is still necessary to request individual project priorities for new facilities. However, the A-10 rating may be used in some cases to provide for connection of new customers to existing facilities and also for materials needed to relieve serious overloads.

The order carries provisions to keep producers' inventories at practical working minimum levels. It also includes provisions to restrict purchases and withdrawals to certain 1940 levels.

Under the priority policies now in effect a 48-hr. answer will be given queries directed to the division in Washington.

Bonneville Turns Down Eastern Oregon Request

Eastern Oregon Light & Power Co.'s request for 3,500 kw. of Columbia River power (EWest, Sept., p. 83) has been turned down by Bonneville Power Administrator Paul J. Raver.

In a letter to LeRoy A. Grettum, manager of the company, Administrator Raver pointed out that the Union County Public Utility District had applied sometime ago for the purchase of Columbia river power, and that under the terms of the Bonneville Act application of publicly-owned agencies must be given preference and priority over those of private utilities in the sale of electricity by the administration.

Citing the fact that Union County citizens had voted for the formation of a people's utility district some months ago, Raver told the company that the administration "could not properly enter into any agreement . . . that would be inconsistent with the expressed objectives of the people of the district." He pointed out that the company had recently refused to sell its entire system at a fair price and that he understood that the district was now prepared to purchase the company's distribution facilities located within the district boundaries.

He pointed out also that the present defense emergency is making unusually heavy demands upon the government for additional power.

TOO MUCH NIGHT LIGHT

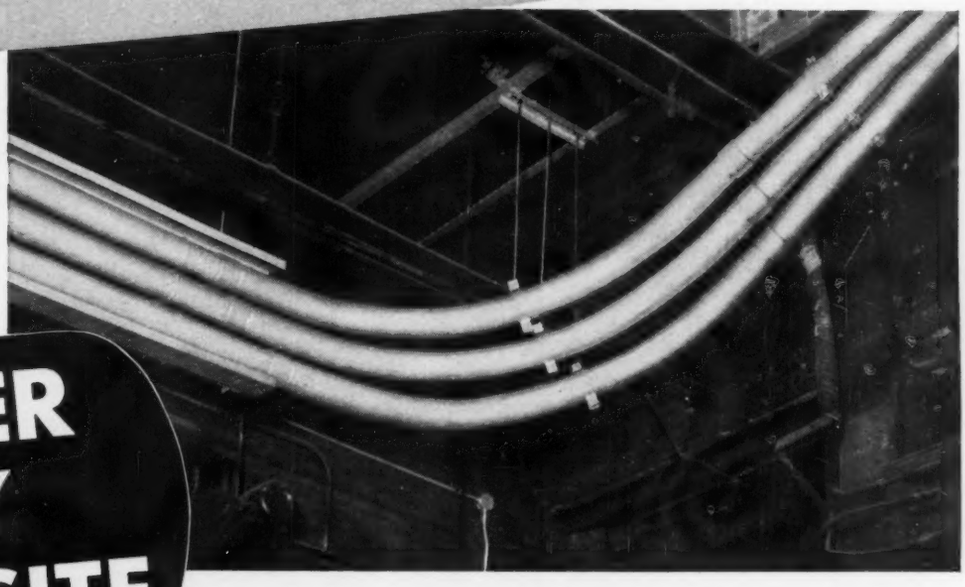
Intense illumination of badminton courts in Pasadena, located in balmy Southern California, has aroused the ire of non-playing neighbors of nocturnal bird-and-racket enthusiasts. Complaints to city officials disclosed that no municipal statutes exist covering this very modern problem, and the city fathers suggested that these situations be ironed out individually. The height, brilliance and beam angle of badminton lights is a problem that will probably be solved by the good old "public nuisance" laws—in the case of too-late, too-loud devotees.

No Power Shortage for Seattle City Light

According to E. R. Hoffman, superintendent of Seattle City Light, there is no power shortage in the field served by City Light, and the city power utility is supplying all demands upon it for electrical energy. However, he states, City Light is making plans to store more and more of its Skagit River water and has its Lake Union auxiliary steam plant ready for operation, if demand for power should surpass the output of the hydroelectric plant. Pointing out that it costs twice as much to operate the steam plant, Hoffman declares it will not be used unless it is absolutely needed.

He also stated that the City Light cannot take on the Bremerton Naval Yard as a customer, because it would require construction of a heavy, costly submarine cable between Seattle and Bremerton, on which delivery would be extremely uncertain.

Looking for a duct that controls induction losses?



BETTER TRY TRANSITE

On single-phase alternating-current lines, the asbestos-cement composition of Transite Ducts reduces induction losses to a minimum.

INDUCTION LOSSES are practically zero when you use J-M Transite Ducts. This means that these asbestos-cement cableways are ideal for carrying single-phase alternating-current lines. And whether used above ground, below ground or on exposed locations, Transite Ducts provide these additional advantages:

Low Installation Costs: Light in weight, easy to handle and assemble, Transite Ducts save time on any job. Underground, Transite *Conduit's* strength eliminates the expense of a concrete casing. Where a casing is required, thinner walled, lower priced Transite *Korduct* is recommended. Its long lengths require fewer joints, spacers and supports. And both Transite *Conduit* and Transite *Korduct* have a smooth bore that assures easy cable pulls at all times.

No Fire Hazard: Made of asbestos and cement, Transite Ducts cannot burn. On multiple-duct, concrete-encased systems, Transite *Korduct* provides the equivalent of extra fire-protection between cables without extra cost. And neither Transite *Korduct* nor Transite *Conduit* will contribute to the formation of combustible fumes or gases.

Low Maintenance Costs: Being non-metallic and inorganic, Transite Ducts won't rust or rot. On exposed locations, Transite Conduit effectively resists weather, smoke and fumes. Underground, it offers unusual resistance to corrosive soils . . . holds its strength and true form under sustained earth loads and traffic pressure.

• • •

For details on both Transite Conduit and Transite Korduct, write for brochure DS-410. Johns-Manville, at Los Angeles, San Francisco or Seattle.

JM Johns-Manville TRANSITE DUCTS

***Transite Conduit*—for exposed work and for installation underground without concrete encasement.**

***Transite Korduct*—for installation in concrete. Thinner walled, lower priced, but otherwise identical with Transite Conduit.**

Remove, Reverse or Replace this point
Chance Pike
Poles save on replacement.
There is no need to buy a complete new pole when the point becomes worn. The point on Chance Pike Poles may be removed and replaced with a new point.
For extra safety in handling and carrying on the truck this point may be reversed. Lacquer finished poles are steel reinforced at head and butt.

Try this on your trimmer • •
TIPS TOOLS
TIPS TREE TRIMMERS
can take it—
It takes a good hefty tree trimmer to cut a 1¾" seasoned insulator pin in two. You get that extra "heft" in a Tips rope operated tree trimmer—you also get a means for attaching a Tips pruning saw for the big limbs, and a means for splicing on additional pole lengths.
Poles are solid spruce, treated with three coats of preservative and voltage tested.
Rope or lever operated types available.
A·B·CHANCE CO·
CENTRALIA MISSOURI

NEW ALUMINUM PLANT GOES TO TROUTDALE, ORE.

Troutdale, Ore., at the junction of the Sandy and Columbia rivers has been selected as the site for a new 90,000,000-lb. per year aluminum reduction plant to be built by the government and operated by the Aluminum Co. of America. This is one of the proposed defense metals plants to be built in the West. Others are slated for Spokane, Tacoma, Las Vegas, Nev., and Yuma, Ariz.

The Troutdale plant will take 97,500 kw. of Bonneville power as contrasted to the present Alcoa requirement of 162,500 kw. at its Vancouver, Wash., plant. There is some likelihood of an aluminum fabrication plant being built adjacent to the reduction unit.

Portland General Electric Seeks Radio Permit

Permission to operate a 400-watt radio transmitting station between its largest hydro plant and main office has been granted to the Portland General Electric Co. by the Federal Communications Commission. Work on the station, which is located at Three Lynx, Oregon, 35 miles east of Portland, will start as soon as necessary equipment is received.

The new station, KRKX, will operate on an ultra high frequency, and ultimately become part of a radio network planned in cooperation with other utilities in Oregon, Washington, Idaho and British Columbia. The new station will insure constant contact with the main office in spite of storm conditions. Replacement of present wire service to other PGE remote hydro plants is also on the schedule for the future.

Tuscon To Get Power from Colorado River Plants

Tucson will soon be receiving Colorado River power over a new 115-kv. transmission line being constructed from Phoenix by the U. S. Reclamation Bureau. Contracts have been let for the materials for the $700,000 110-mile line. It will be an extension of the present line from Parker Dam to Phoenix.

Contracts let for materials include one for $216,729 to Nehring Electrical Works, DeKalb, Ill. for 360 miles of seven-strand, hard drawn copper conductor; another for $66,545 to the Idaho Pole Co., Sandpoint, for 1,960 poles and a third to the Corning Glass Co. for insulators.

The line will extend from the present USBR substation adjacent to the Central Arizona Light & Power Co. Phoenix steam plant to Coolidge and then to Tucson. The U. S. Indian Service will receive power for irrigation pumping at a substation at Coolidge and the Tucson Gas, Electric Light & Power Co. will take 15,000 kw. to supplement its present supplies.

For the present the line will deliver Boulder Dam power pending the completion of the Parker Dam plant, the first 30,000 kw. unit of which is scheduled for operation in December.

SEC Declares PG and E to be Holding Company Subsidiary

Over-ruling the findings of a trial examiner, the Securities and Exchange Commission has held that Pacific Gas and Electric Co. is a subsidiary of North American Co., and as such is subject to regulation under the Utility Holding Company Act. The finding was based upon North American's holdings of 17.71% of the total PG and E voting stock, both common and preferred. Under the law a 10% interest has been taken as a criterion of holding company rather than investment position.

An appeal to the United States Circuit Court of Appeals requesting a stay of execution of the SEC order was filed by PG and E on Sept. 18. The company asked for a court hearing and ruling on the order.

In its ruling the SEC said that except for the "controlling influence" represented by North American's holdings PG and E would be exempt from federal regulation, since its operations and those of its subsidiaries are predominantly intrastate in character. This has led to speculation as to whether PG and E would be exempted if North American disposed of 910,000 of its 2,059,670 shares of common stock, thus reducing its interest below 10%.

The SEC admitted that it could find no record of attempts of North American to interfere either with operation or policies of PG and E. It contended, however, that "control" by North American existed in the form of stock ownership and could be used if there ever was dissatisfaction with the local management and normal growth of the company.

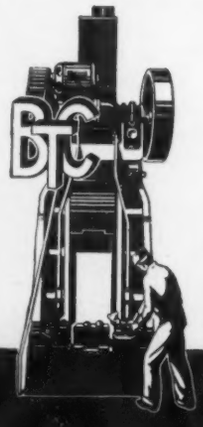
The findings cast no stigma on the company nor do they mean that it cannot properly be regarded as a California corporation, the SEC agreed. "Nor do we mean to indicate that the influence of North American is, or will be, improperly exercised," the ruling said.

FORGINGS AND CANDY

DELICIOUS creamy, tender fudge—or tough chewy taffy. Just why should there be such a difference in texture when both have approximately the same base? The answer as we know is in the pulling. In a similar manner the forging billet is made tough and fibrous by the rolling at the mill. The forging process further refines this grain structure. Forgings offer uniformity and strength.

THE BREWER-TITCHENER CORPORATION
Cortland, New York

FORGERS OF HI-LINE HARDWARE

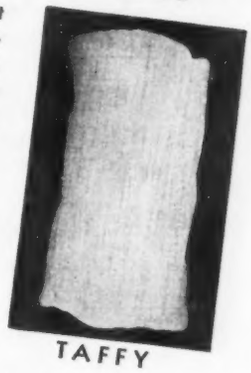


THROUGH YOUR INSULATOR MANUFACTURER ONLY

Little Lessons in Forging

The photomacrograph to the right shows the granular texture of a piece of fudge. It is the result of melting and cooling without working. To the right is a photomacrograph of a piece of taffy. Notice the striking resemblance to the grain structure in a forging billet. The difference was obtained by working, or pulling the candy before cooling. In a similar manner the grain structure in the forging billet was obtained by the rolling at the mill.

FUDGE



TAFFY

A fully illustrated booklet outlining the history of forging will be sent free on request as long as the supply lasts.

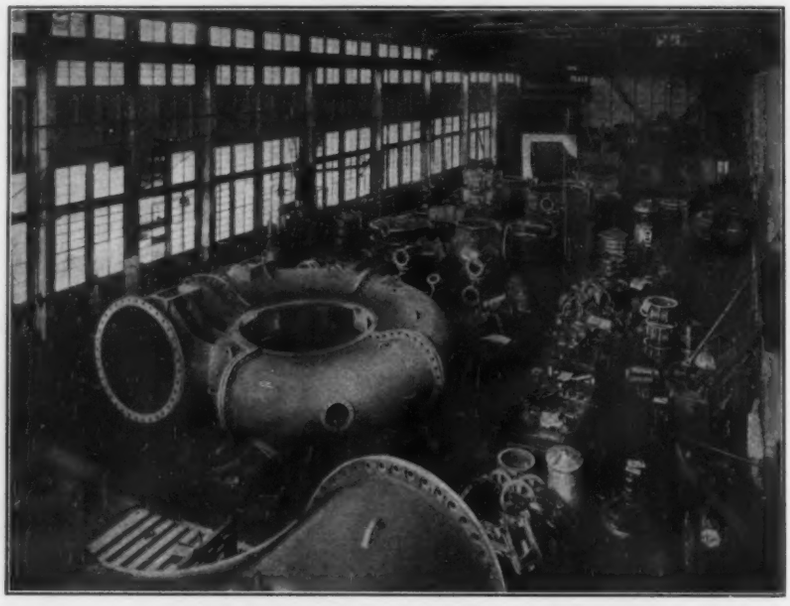
YOU KNOW WITH A FORGING

FPC SEEKS CONTROL OVER PIT RIVER PLANTS

Briefs have been filed in the Federal Power Commission hearing to determine whether or not the commission has jurisdiction over the Pit No. 5 plant of the Pacific Gas and Electric Co. Decision will be made by the commission after the filing of a report by the special examiner.

PG and E contends that since the $22,000,000 plant is to be built on private lands, no FPC license is required. The commission has contended that the development comes under the Federal Water Power Act because it will affect the navigability of the Pit River. The navigation contention has hinged on the fact that logs were floated down the river between 1884 and 1912. Opinion is that the case may rank in importance with the New River case before it is completed.

● Lincoln County (Wash.) Electric Cooperative has purchased 107 miles of rural lines and equipment from six utility organizations. Price was $55,000. Washington Water Power Co. was paid $12,800 for transformers and meters and the balance went to five farmer-owned organizations.



Power for Defense

Electricity . . . for light, heat and power, is the basic requirement in our rapidly expanding defense production program. To provide for present demands and anticipate future needs is the responsibility of utility management whose progressive policies will insure an ample supply.

It is Pelton's privilege to collaborate with the utilities in production of hydraulic prime movers, a purpose to which the extensive engineering and plant facilities of this company are unreservedly devoted.

The Pelton Water Wheel Company
2929 NINETEENTH ST. SAN FRANCISCO

BLW THE BALDWIN GROUP PELTON
Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

TACOMA APPLIES FOR NISQUALLY LICENSE

City of Tacoma has applied to the Federal Power Commission for a major license to construct two hydro plants on the Nisqually River in the Snoqualmie National Forest in Washington. The stations comprise a major power development program being undertaken by Tacoma's Lighting Department.

The application defines the upstream development as consisting of a concrete arch dam (Alder Dam) about 300 ft. high, a storage reservoir with about 147,000 acre-ft. usable capacity, a power house at the foot of the dam with an installed capacity of 50,000 kw. operating under a gross static head of 265 ft., a switchyard and three miles of 110-kv. transmission line to La Grande.

Features of the downstream development include a 200-ft. high concrete diversion dam (La Grande Dam), a regulating reservoir of approximately 10,000 acre-ft. capacity, 6,500 ft. of 14½-ft. diameter tunnel, a surge tank, steel penstocks, a power house with 64,000 kw. installed capacity operating under a gross head of 420 ft., a switchyard and 35 miles of 110-kv. line extending to a substation near Tacoma.

● Yakima County (Wash.) PUD has retained the engineering firm of Burns & McDonnell of Kansas City, to prepare plans for constructing a distribution system in the county.

Bonneville Average Rate Is 2.19 Mils per Kw.-Hr.

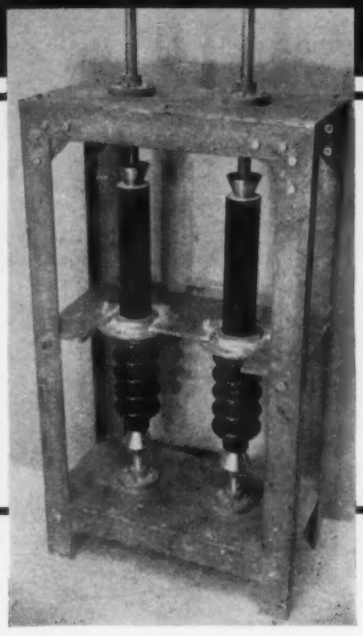
For the first six months of 1941 the Bonneville Power Administration sold 585,956,866 kw.-hr. at wholesale and received $1,284,927.77 in revenue, or an average rate of 2.19 mils, according to market figures just released.

Twenty public agencies including nine municipalities, seven PUD's and four cooperatives purchased 22,407,796 kw.-hr. and paid $84,858.47. Average rate was 3.79 mils. Largest customer in this group was the Gray's Harbor PUD, with a maximum demand of 4,476 kw. and a kw.-hr. requirement of 9,042,295.

Two private utilities, Portland General Electric Co. and West Coast Power Co., purchased 130,925,410 kw.-hr. and paid $307,410.10, with virtually all of the power being taken by Portland GE. Aluminum Co. of America, Oregon Shipbuilding Co. and Pacific Carbide and Alloys Co. bought 432,605,660 kw.-hr. and paid $892,404.83, or an average rate of 2.06 mils. Aluminum Co., with a demand of 161,504 kw., was the largest power customer.

TRANSFORMER BUSHINGS

Uniformly Assembled FOR EASY INSTALLATION

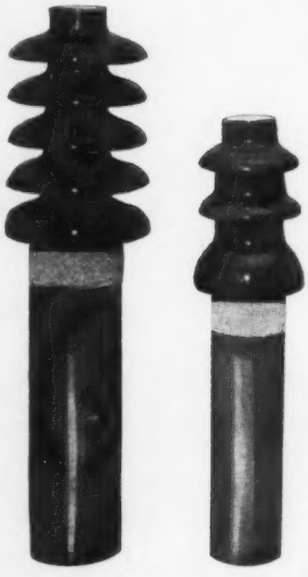


THIS NOVEL JIG

designed by

ILLINOIS PORCELAIN

ENGINEERS ASSURES PERFECT BOLT HOLE ALIGNMENT IN TRANSFORMER BUSHINGS



The jig illustrated was built to insure uniformity of assembly so that no difficulties are encountered in assembling transformers when Illinois Porcelains are used. It is one of the many devices perfected by Illinois Engineers to insure this important factor.

Modern facilities and rigid inspections take all of the guess-work out of Illinois production, giving you exact dimensions regardless of size of porcelain or quantity ordered.

Only specially selected, highest quality materials are used. This, plus modern Illinois porcelain manufacturing, insures balanced interior stress, homogeneity of structure, high dielectric strength, high mechanical strength, and permanence of glaze in every piece produced.

Write for catalog.

Standardize on

ILLINOIS PORCELAIN

TOP QUALITY . . . EXACT DIMENSIONS

ILLINOIS ELECTRIC PORCELAIN CO. **MACOMB, ILLINOIS**

Feature this fast selling, long profit line for Xmas—Attractive, Dependable, Modern, Economical—and needed in every home . . . Order from your jobber NOW!

Seven Leaguer, (L. P. 131) weighs 14½ lbs., long cord. Attractive finishes in morocco brown or ivory. 1320 watts, 120 volts, A.C. or D.C., Height 39½ in. Base Diameter 10 in.

Spred-Ray, (MP 121) radiates heat in large arc. 1250 watts, 120 volts, A.C. Chrome Top, duotone brown base and grille. 6 ft. cord, spring action plug. Height 17½ in., Width 10 in., Depth 10 in.

Heat Fan, (HF 161) Warms in winter, Cools in summer—White or morocco brown. 1650 watts 115 volts, Height 11⅞ in., Width 9¼ in., Depth 5⅜ in.

THERMADOR

3119 So. Riverside Drive, Los Angeles, California • 2311 Madison Street, Oakland, California

EVERSTICK ANCHORS...

Provide dependable anchoring when poles are subjected to unusual strains from storms. Made of tough, certified, rust resistant, malleable iron for extra strength and holding power.

Write for new bulletin

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Answer to "Who Am I?"

See quiz on page 72

I. W. Borda

Electricquiz Answers

See the quiz on page 71

1. False. Electric elevators undoubtedly carry more passengers per day in cities than surface cars.
2. False. A '49-er of the 1941 brand is one who has sold a lighting installation averaging 49 ft.-candles or over.
3. True. The speed of light and other electro-magnetic waves is 186,300 miles per second. There are 746 watts to a horse-power, and 3412 British Thermal Units to a kilowatt.
4. False. During an electrical storm, a depression or valley is a safe place, because lightning takes the shortest path to ground via hilltops and ridges.
5. True. Its steel top is a shield which will conduct the lightning around you to ground.
6. False. Red Seal represents the *minimum* electrical installation which should go into a home.
7. False. No light source repels insects. Some, due to reduced brightness, such as lamps in red, amber and yellow tones, attract fewer insects than others.
8. False. The orchestra may be playing "The Domestic Symphony" by Richard Strauss, whose score calls for an electric vacuum cleaner.
9. False. The quantity is estimated conservatively at over 20,000,000.
10. True. A very few of the original names have been retained. Minnesota, the source of the Mississippi River, is considered K throughout.

SPEEDY and Efficient Communication is an Essential in any plant today.

Couch offers a wide range of Private Telephones — with a system to meet practically any requirement from 2-stations up to a 50-line automatic system.

Every 'phone has a background of nearly 50 years of telephone manufacturing experience back of it.

—Write for Catalog—

S. H. COUCH COMPANY, INC.
NORTH QUINCY, MASS.
Sales Offices in Principal Cities
Established 1894

LOS ANGELES—H. H. Van Luven Co., 307 E. Third St.
PORTLAND—J. M. Cavanaugh, 131 S. W. 4th Ave.
SAN FRANCISCO—E. B. Cook Co., 1063 Howard St.
SEATTLE—Northwestern Agencies, 2411 1st Ave.

—Manufacturers—

Fire Alarms — Bells
Annunciators — Cables
Blake Staples — Code Call

All that Others Offer

+Plus

+ plus 3 new, major improvements.
+ plus POSITIVE contact.
— minus costly breakage and costly fixture assembly.

Lloyd Rotator Twist-Type Lamp Holder

Was Created by

LLOYD ENGINEERS

1 Easy to Insert the Lamp

Place one terminal pin in slot. A half-turn in either direction does the trick. No strain on pins or casing.

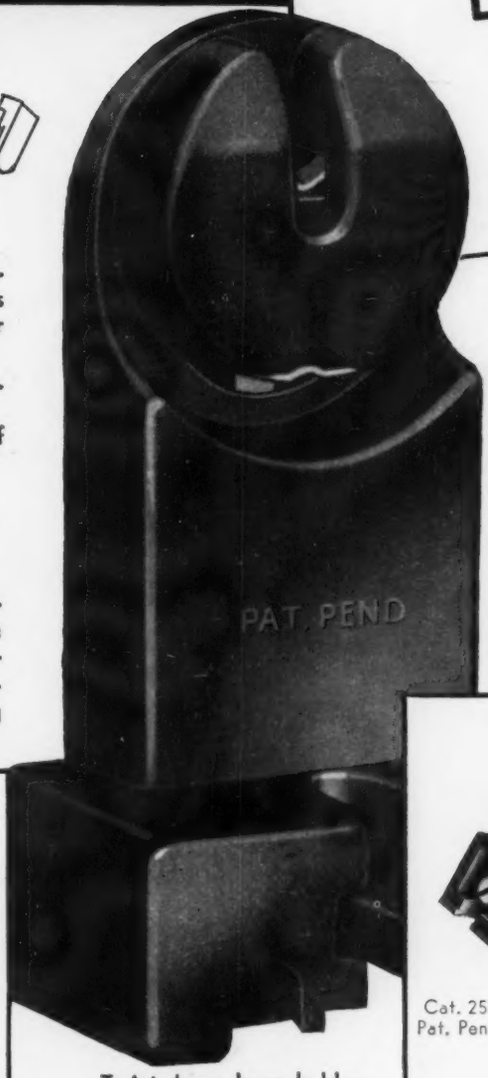
Twist — Click — It's Locked. Positive contact.

Absolutely simple, fool-proof action.

2 Strong Bakelite Casing

Made of high strength materials. Head beveled at top. Gives extra clearance for inserting lamp. Prevents strain on pins and casing.

Nut-Retainer Slot makes mounting easy, fast and economical.



Twist-type lamp holder
Black-Cat. 351
White-Cat. 351-W
Pats. Pend.

3 Tempered Steel Spring for Double Duty

Steel spring more than doubles holding strength of lock with no loss of flexibility.

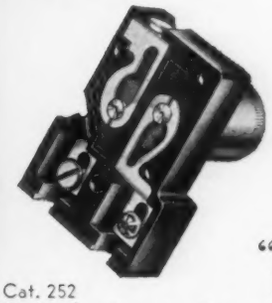
No other twist-type holder has it.

Makes absolute contact.

You feel it and hear it lock.

Lloyd Twist-Type Lamp Holder with Starter Socket

Black-Cat. 353
White-Cat. 353-W
Combined with Starter Socket Cat. 252
Pats. Pend.



4 Lloyd Starter Socket

Cat. 252
Pat. Pend.

With "Lobster Claw" Dual Lock

The vise-like grip of the "Lobster Claw" absolutely locks starter pins. Makes perfect contact. Can't come loose. Exclusive with Lloyd.

LISTED UNDER REEXAMINATION SERVICE UL UNDERWRITERS LABORATORIES, INC.

Listed and approved by Underwriters' Laboratories Inc.

Starter Switches
FS-2
FS-4
Certified by Electrical Testing Laboratories Spec. 6

LLOYD PRODUCTS CO.

PROVIDENCE, R. I.

REPRESENTATIVES—BRANCH OFFICES AND WAREHOUSES IN 22 LEADING CITIES

LLOYD POLICY INSURES QUALITY

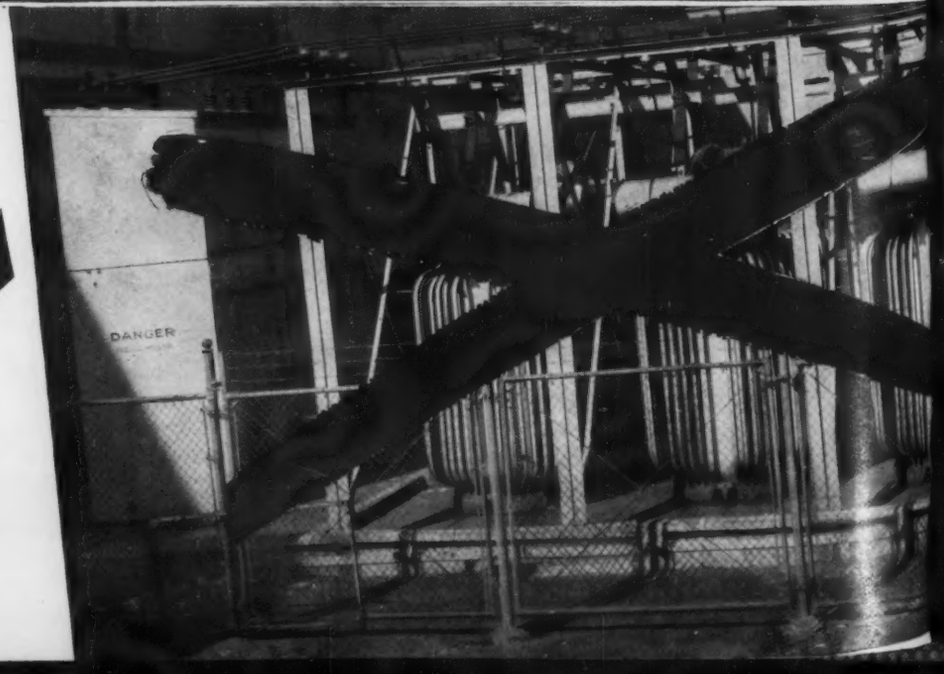
WESTERN REPRESENTATIVES

Seattle, Wash.	San Francisco, Calif.	Los Angeles, Calif.	Denver, Colo.	Dallas, Tex.
Albert S. Knight Co.	Thos. D. Noble Co.	Coastal Sales Co.	L. G. Bachand	Geo. E. Anderson
3006 Western Ave.	210—12th St.	440 Seaton St.	2129 Federal Blvd.	Santa Fe Bldg.

The New and Better Way

THIS

NOT THIS



Properly co-ordinated for better operation, G-E unit substations are easier to buy, easier to install, more attractive in appearance than old-style, piecemeal substations. And these compact, metal-enclosed units can be located almost anywhere—many times in space that is otherwise worthless.

. to Provide Low-voltage Power

★ IN INDUSTRIAL PLANTS

★ IN COMMERCIAL BUILDINGS

★ FOR POWER-STATION AUXILIARIES

NEW G-E metal-enclosed, ready-to-install UNIT SUBSTATIONS—completely factory assembled and fully co-ordinated for dependable operation—offer these distinct advantages:

Greater Safety

Metal-enclosing of all live parts means greater safety for personnel. Circuit breakers of proper rating assure adequate protection for equipment.

Quick, Easy Installation—Lower Costs

These units are shipped in two or three *complete* sections —all ready to be bolted together and connected to the power cables.

Build no vaults. Make no long secondary runs. Just set these compact, metal-enclosed units near the load center with an obvious saving in time and expense.

Lower System Investment

System investment and losses are considerably lower because Pyranol* permits installation right at load centers, thereby eliminating long, costly, low-voltage circuits from a distant substation. Performance of motors, lamps, etc. is improved because the voltage-drop in such long, low-voltage circuits is avoided.

Simplified Purchasing

Only *one* purchase transaction, involving a simple, functional specification, is required; the entire equipment comes from one manufacturer. The purchaser is thus relieved of all design and co-ordination problems.

THESE standard ***unit substations*** are now available for serving loads 600 volts and below (120/208Y, 480 volts, etc.) from incoming lines up to 15 kv. They can be furnished for outdoor as well as indoor installation.

A metal-clad incoming-line section with oil-blast or magne-blast power circuit breakers, a Pyranol* (or oil-filled) transformer section, and a low-voltage feeder section with air circuit breakers comprise these units—smaller editions of the higher-voltage G-E unit substations that have proved themselves in more than 200 central station installations during the last ten years.

Here's the modern way to help assure an adequate, reliable power supply at all times—more important than ever in the light of present conditions. Bulletin GEA-3592 gives further details on these money-saving units. Ask your G-E representative for a copy. General Electric, Schenectady, N. Y.

*PYRANOL is G.E.'s trade-mark for a nonsludging, insulating and cooling liquid that will not burn.

GENERAL ELECTRIC

401-8-170C

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

Sunbeam

Automatic MIXMASTER
Double Automatic IRONMASTER
SILENT AUTOMATIC TOASTER
Automatic COFFEEMASTER
SHAVEMASTER
FLAT TOASTER • FAN HEATER
GLASS COFFEE MAKERS
WET-PROOF HEATING PAD
MASTER PLUG & CORD SET
WAFFLE BAKER

MADE AND GUARANTEED BY
CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Illinois
737 S. Hope Street, Los Angeles, Calif.
224 S. W. Temple Street, Salt Lake City, Utah
557 Market Street, San Francisco, Calif.
50 YEARS MAKING QUALITY PRODUCTS

FINISH JOBS IN RECORD TIME
with IDEAL Wire Nuts
Solderless, Tapeless Wire Connectors
MILLIONS IN USE

- Thread onto wires just like a nut on a bolt.
- Strip Wires—Screw On—That's ALL!
- SAFE—No hot soldering iron or blow torch.
- Better electrically — Stronger mechanically.
- Sizes for all common wire joints.
- Fully approved; listed by Underwriters' Laboratories, Inc.

NEW IDEAL
FISH TAPE REEL and PULLER

- Saves costly tape breakage.
- Keeps fish tape under control.
- Reel gives good grip.
- No. 00 "Handy" size, only $1.50.

OTHER IDEAL MONEY SAVERS

IDEAL SOLD THROUGH JOBBERS

IDEAL COMMUTATOR DRESSER COMPANY
WEST COAST WAREHOUSE STOCKS:
Strieby & Barton Ltd., 912½ E. 3rd St., Los Angeles, Cal.
F. M. Nicholas Co., 1123 Harrison St., San Francisco, Cal.
L. S. Foley, 1233 N. W. 12th Avenue, Portland, Oregon
Robinson Sales Co., 3215 Western Avenue, Seattle, Wash.

REA Statistics—11 Western States—June 30, 1941

State	Borrowers (No.)	Total Amount	Systems Energized	Miles of Line Energized	Customers Connected	Percent Farms Electrified
Arizona	3	$ 953,000	3	452	934	41.3
California	5	1,913,500	4	1,467	3,674	76.2
Colorado	17	5,527,000	13	3,794	8,106	23.4
Idaho	10	3,197,750	8	2,385	5,051	57.1
Montana	13	3,327,598	13	2,407	5,720	18.2
Nevada	2	254,000	1	109	392	41.6
New Mexico	5	1,272,000	4	784	1,596	12.5
Oregon	13	3,288,500	10	1,211	3,636	49.6
Utah	3	899,000	3	548	1,693	55.9
Washington	18	6,225,700	15	3,608	7,918	66.0
Wyoming	10	2,223,800	9	1,665	3,493	19.4

REA Reports on Rural Electrification Progress

Out of total appropriations of $474,003,363, REA had allotted $379,888,121 to 831 borrowers at the end of July, 1941, according to a recent statiscal report. Of the money allotted $356,923,288 was for distribution systems, $14,733,150 for generation and transmission facilities and $8,231,683 for wiring, plumbing and other purposes.

Twenty-four private utilities had borrowed $5,463,766, 51 public bodies had received $19,074,263 in allotments and 756 cooperatives the balance. Allotment estimates of lines to be built totaled 362,949 miles to serve an estimated 1,190,556 customers. By the end of June, latest month for which figures were available, 732 systems had been energizing, comprising 307,562 miles of line serving 780,933 customers.

Data for the 11 Western states are contained in the accompanying table.

Utah Commission Rules Out Tax-Adjusted Rates

Public Service Commission of Utah eliminated so-called "adjustment clauses" from the Utah Power & Light Co.'s new schedule on combination commercial and street lighting rates that were to have become effective Sept. 11. The adjustment clauses of the new schedule, to effect annual savings immediately of $100,000 a year and ultimately of $215,000 per year, provided customers were to take advantage of all opportunities for consolidation of wiring to direct power through one meter, would have permitted the power company to increase rates when the department of labor commodity index rose above 95 and reduce them when it dropped below 65, to adjust rates to taxes and to the power factor in the case of commercial schedules.

The commission refused to permit these adjustment clauses to become effective on the grounds that "because we do not believe it is sound ratemaking to tie rates to commodity prices. Even if commodity prices went up, we believe the consumption of electric energy and the net profits of the utility would rise. For the same reason the utility should be able to take care of increased taxes, which is one of the legitimate costs to be born by an increase in revenue."

Stanford University Offers Special Electrical Courses

Stanford University is offering two electrical courses in San Francisco as part of the engineering, science, and management defense training program sponsored and financed by the U.S. Office of Education. One course covers the fundamentals of electric waves and the second protective lighting and industrial lighting for defense. Both courses began Sept. 15 and will continue with one lecture a week for 20 meetings.

The electric wave course, with H. H. Skilling, associate professor of electrical engineering in charge, covers electrostatics, vector analysis, magnetostatics, electrodynamics, electromagnetic wave equations, propagation and reflection of plane waves, spherical wave radiation and guided waves.

Leland H. Brown, assistant professor of electrical engineering, is giving the lighting course which covers such subjects as fundamentals of illuminating engineering, including the characteristics of the newer light sources, lens and reflector systems.

● FREAK WIND and rain that struck Phoenix Sept. 12, blew down lines of both the Central Arizona Light & Power Co. and the Salt River Valley Water Users' Assn. Most severely damaged was the 45,000-volt Water Users' transmission line serving the west end of Salt River Valley. Lattice steel poles were bent double by the wind.

● POSSIBILITY of completion of the Fort Peck Dam power installation late in 1942 or early in 1943 has been announced in Washington, D.C. The plant originally was scheduled for 1944. The Reclamation Bureau is seeking $500,000 in appropriations for transmission lines from the dam.

Announcing

THE NEW SERIES-E * UNIVERSAL MATTHEWS FUSE LINKS

Matthews
MATTHEWS
20E
Fuse Links
For better fusing performance, accuracy in fuse link design is of utmost importance. The Matthews Fuse Links shown in this Bulletin insure this better performance.
W. N. MATTHEWS CORPORATION • ST. LOUIS, U. S. A
BULLETIN 104
SEPTEMBER, 1941

* COMPLY WITH NEW NEMA STANDARDS

ASK FOR YOUR COPY OF BULLETIN 104

Faith IN THE Future OF MODERN METERING...

ELECTRIC ROASTER

MODERNIZE ELECTRIFY YOUR KITCHEN

1000 WATT IRON

BETTER LIGHT BETTER SIGHT

I. E. S. LAMPS

ELECTRIC BROILER

ADEQUATE WIRING SERVES AND SAVES

ELECTRIC IRONER

Faith in the future is an inherent quality of the American people. Because of that faith tremendous strides have been made in the development and use of electrical household appliances, resulting in a kilowatt hour consumption that has more than doubled in the past fifteen years.

Faith in the future has caused the electric utility industry to cooperate with the watthour meter manufacturers, with the result that the design and development of the modern watthour meter has kept well ahead of the metering requirements of these ever growing loads.

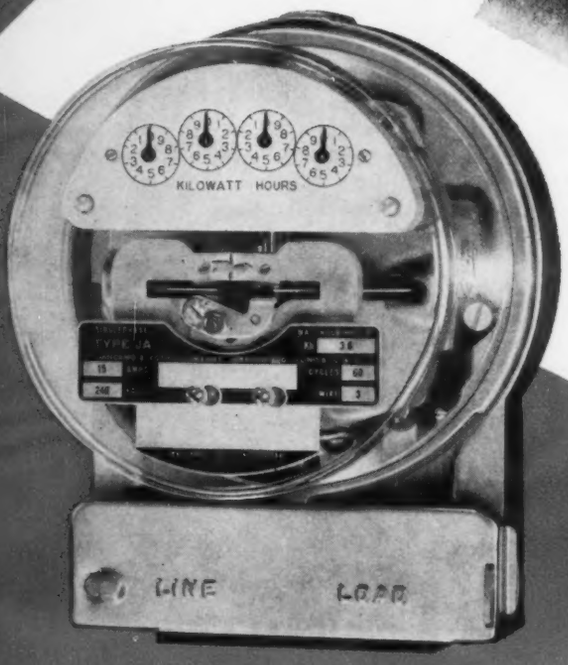
Faith in the future, and a willingness to back that faith with intelligent concerted effort, is more necessary now than ever before. Our country's defense program has necessarily caused serious upsets in production plans and schedules. The watthour meter manufacturers, like everyone else, are faced with material shortages, longer delivery schedules, and the necessity of making material substitutions. But in spite of this, as always in the past, the art of metering, and of meter design, will continue to advance.

When normal times are once more restored, as they are sure to be, watthour meters will again play their important part in system rehabilitation as envisioned by the slogans "Appliance Loads are Payloads when Metered with Modern Meters," and "Only Watthours Metered Add Revenue Gains!"

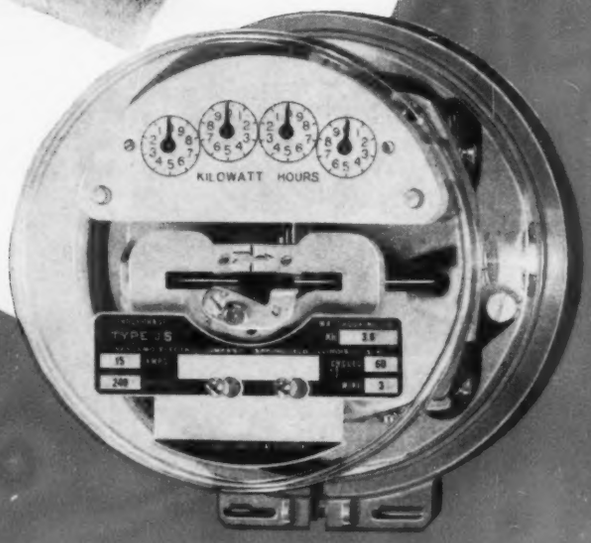
PAYLOADS WHEN METERED WITH MODERN METERS

SANGAMO ELECTRIC

THE SANGAMO TYPE J METERS

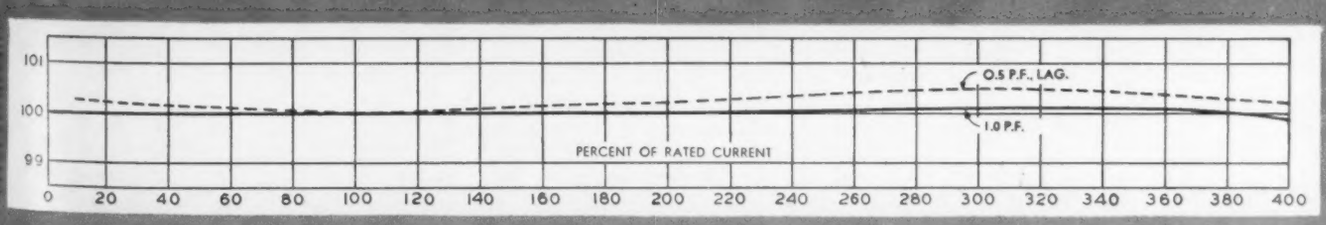


SANGAMO TYPE JA WATTHOUR METER



SANGAMO TYPE JS WATTHOUR METER

AVERAGE LOAD CHARACTERISTIC CURVE OF THE TYPE J METER



COMPANY SPRINGFIELD ILLINOIS

ARGUMENTS MARSHALLED AGAINST SF PLAN NINE

Plan 9, designed for putting San Francisco into the municipal power business, will appear on the Nov. 4 ballot of that city as Charter Amendment No. 1. Similar measures have been defeated eight times. As agreed to in stipulations advanced by Secretary Ickes, no controversial measures will be on the same ballot. Only other proposition is a charter amendment changing the year of election of the city assessor. Sidetracked were controversial wage increase propositions for fire and police departments.

Conducting the campaign in favor of the bonds is a Citizens Power Committee that has the backing of the city administration (another stipulation of Secretary Ickes), the San Francisco Labor Council and the Building Trades Council. Opposition is headed by the Committee to Defeat the Power Bonds and Amend the Raker Act, which has the support of many civic and business groups.

Plan 9 proposes the issuance of $66,500,000 of revenue bonds to be used for purchase of parts of the Pacific Gas and Electric distribution system, for enlargement of power generation and transmission facilities and for contingencies. Analyses of the capital assignment indicate that the various undertakings set forth will probably cost $90,000,000 instead of the amount to be authorized. For instance, $2,542,000 is set aside for purchase of the 44,000-kw. Station "P" steam plant and an additional $2,673,000 for a 48,000-kw. addition, an average of $56.70 per kw. as against the going price for steam additions of approximately $100 per kw.

Under Plan 9 power requirements over and above the available output of the Hetch Hetchy plant would ultimately be secured from the Central Valley project. Because of this, purchase of three steam plants, major substations, transmission facilities, and cables across San Francisco Bay are omitted. It is pointed out that the $4,500,000 set aside for intangibles such as severage damages, going concern value, etc., is considerably less than the 34.9% of the reproduction cost new, less depreciation, that the California Railroad Commission allowed when a valuation was made in 1929.

Other discrepancies in Plan 9 include $3,362,000 in overlooked expense deductions that would reduce the asserted annual surplus of $5,233,000 to $1,871,000, or less than the city now receives for Hetch Hetchy power sold to PG and E. No allowances are made to cover interest or redemption of $24,611,889 in capital investment already in the power project. Also statements as to comparative rates and possible rate reductions contained in Plan 9 have been shown to be incorrect.

There is speculation as to what action the California Railroad Commission may take with respect to pending rate reductions that the commission is ready to order for the PG and E system. Such a reduction is "in the works" and proponents of the bond issue have urged that any announcement regarding it be delayed until after the election. Meanwhile the financial calculations of Plan 9 do not take into account the effect of future rate reductions on possible surplus.

Utilities Staff in OPM Now Numbers Sixteen

Utilities' priorities matters will be handled by the staff of OPM's power unit, headed by J. A. Krug, on leave as TVA's manager of power. The staff of the unit now numbers 16 divided roughly into four divisions — priorities, production and transmission, requirements and statistical and legal.

Dr. John C. Parker, Consolidated Edison Co., is chief priorities specialist, assisted by Frederick Schaff, Superheater Co., Harry W. Scott, Union Electric Co., William Zepp, OPM priorities division liaison and Manley Goodyear, priorities attorney.

Production and transmission matters are assigned to J. E. Moore, Ebasco Services, Inc., and W. S. Peterson, Los Angeles Bureau of Power and Light, with S. E. Schultz, chief engineer of the Bonneville Power Administration, as special assistant for the Pacific Northwest. On power requirements data Edward Falk, Consolidated Edison Co., and Constantine Barry, Philadelphia Electric Co., work with George Buck and Walter Caine of the FPC staff.

Chief statistician for the unit is Barkley Sickler of the Bonneville Administration and Herbert Marks, former Bonneville chief counsel, is the unit attorney. Newest staff member is Willis J. Spalding, superintendent of the Springfield, Ill., municipal plant, who will handle municipal plant matters.

● FPC HEARING in which California Oregon Power Co. has been ordered to show cause why certain accounting recommendations made by the commission should not become effective has been postponed from Sept. 22 to Nov. 17.

● MUNICIPAL power plant of Beaver, Utah, has begun construction of a 750 hp. hydro-electric plant on the Beaver river.

SEATTLE APPROVES $928,000 EXPANSION BUDGET

Seattle city council unanimously approved City Light's program for expansion of its facilities to take care of its increasing load when it passed an ordinance appropriating $928,000 to finance construction of additional substations and to extend the department's distribution service to reach new customers. The appropriation will come from the department's current earnings as a loan, to be repaid from the proceeds of future bond sales.

The council also adopted a resolution authorizing Superintendent of Light E. R. Hoffman to make an application to the Federal Works Administration for a grant in aid of the proposed construction of a pole yard and for distribution service extensions. A grant of approximately $400,000 will be requested, this grant to be matched by an equal amount of City Light funds.

Washington Water Power Loses Kettle Fall Suits

Washington Water Power Co. has lost a $500,000 suit for damages against the United States government for losses incurred when the Kettle Falls Power site on the Columbia River was flooded behind Grand Coulee Dam. The suit was dismissed from Federal Court. At the same time a notice of appeal was filed.

The court held that the power site had no value except that accruing to the agricultural, timber and grazing values of the land, because no license for a power development was ever obtained. The company had bought the site in 1921 and had made investments totaling $471,000 looking toward ultimate development of power possibilities.

● APPLICATION to continue to export power to Mexico has been filed with FPC by the California Electric Power Co. (formerly the Nevada-California Electric Corp.) The filing was made to correct an oversight caused when FPC was not asked to approve transfer of export authorizations from the Southern Sierras Power Co. and Yuma Utilities Co. when these were merged to form Nev-Cal.

● MONTANA POWER CO. has leased the 288-mile, 154-kv. Great Falls-Fort Peck transmission line, used to supply construction power to the Fort Peck Dam, from the War Department for two years. Incidental power will be supplied to the Army Engineers at the dam and the line will provide a transmission loop from Rainbow powerhouse to Glasgow, Mont.

NORTHWEST M.O. MEETING BACKS "ONE MAN" RULE

Efforts to solidify public power proponents behind the "one-man" administrator Columbia Power Authority bill now before Congress featured the Northwest Public Ownership convention held variously at Grand Coulee, Skagit River and Tacoma last month. Principal speaker was Secretary of the Interior Ickes who defended the bill which would give his office authority to appoint and direct the administrator over Bonneville-Coulee power. An alternative measure would place control under a three-man "home rule" board.

Observers characterized the campaign waged in favor of the one-man administration as a smoke screen to cover up many other issues in a bill that would ultimately federalize Northwest power resources. A resolution finally passed dodged the debatable administration feature but urged "immediate" action by Congress. A second resolution which failed to pass, however, would have placed the convention on record as favoring public ownership of communication systems.

Secretary Ickes Berates Press and Power Companies

Assailing newspapers as well as private utilities, Secretary of the Interior Ickes made a determined argument in favor of one-man direction of the Columbia River Authority in a speech before the Northwest Public Ownership convention at Tacoma, Sept. 5. "We need this bill," he said, "because it will make more solid and secure the position of public power in this area . . . because it will enable us to buy out the private power companies in this area."

Commenting on San Francisco's Hetch Hetchy situation, Secretary Ickes claimed that "probably the press of no city in the land, has so persistently and unfairly attacked me as have the newspapers of San Francisco, with one exception, because I took seriously my oath of office to see to it that the Raker Act was obeyed . . . Now at last the City of San Francisco is seriously addressing itself to the problem of compliance with the Raker Act. But, again with one exception, the newspapers of that city are thumbing their noses at the Supreme Court of the United States, which has pointed out in clear and explicit language, not only the legal, but the moral duty that lies upon that city to distribute Hetch Hetchy power . . ."

Efforts of Northwest utility executives to work out cooperative measures to provide for industrial power during the defense emergency brought forth the following comments from Secretary Ickes:

I got two real kicks recently out of visits to my office by the presidents of two great power companies. They were pleasant gentlemen and I hope they enjoyed their visits as much as I did. What particularly entertained me was their suggestion that, now that we found ourselves in a national "emergency," the public power program would, of course, be laid away in lavender. Instead of going forward with such a program as we have undertaken here in the Northwest, for instance, we should lovingly wrap our transmission lines around each other's necks and dwell together in choking peace and strangling amity. It happens that the two gentlemen in question have great interests in the Northwest and when I told them that I saw no occasion to pause in our plan to extend public power in this section of the country, but that, on the contrary, an opportunity was presented to press forward more rapidly, they were visibly disappointed. I am afraid they decided that, after all, I wasn't a good fellow.

We are hearing a great deal about interconnections between public and private utilities these days and some of our public power friends are doing more loose talking along this line than I wish they were. I am in favor of necessary and proper inter-connections, but we must know what we are doing. We should be certain at all times that what we are doing will not result in the tragic fate of waking up at the end of the emergency and finding ourselves a Laocoon in the death grip of tentacles that we thought were merely innocent "inter-connections."

We would only be fooling ourselves if we supposed for a minute that the private utilities wish to enter into an armistice with public power for the duration of the emergency. They are willing to do no such thing. They regard this as an opportunity to catch us off our guard, if they can, in order to entrench themselves at our expense. I have said before that money is never patriotic and money, or the obtaining of it, is the sole and idolized objective of the private utilities. Their only interest in the public is to squeeze from it all of the profit that is possible. Their ambition is to sell their power at the highest possible rates.

● CONSOLIDATED condemnation proceedings of public utility districts against the Puget Sound Power & Light Co. in Lewis, Thurston and Cowlitz counties, originally set for October 7, has been postponed until October 21, and Federal Judge Lloyd L. Black of Tacoma, Washington, has stated he will decide shortly whether the case should not be postponed to December 9. The postponement was due to the possibility of a newly-appointed judge for the Tacoma bench.

● STANDBY SERVICE to Mare Island Navy Yard, which has its own generating facilities, will be furnished by Pacific Gas and Electric Co. at a cost of $300,000. A government-owned line will be built from the present PG and E Carquniez crossing to the navy yard.

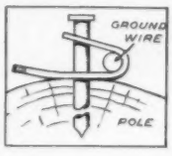
caused 75% of bad INDUCTIVE ARCS

and these

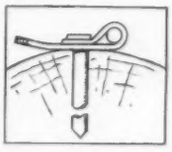
KEARNEY

GROUND WIRE CLIPS

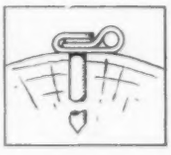
stopped troublesome Radio Interference



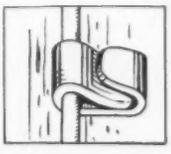
GROUND WIRES on poles were checked. Everywhere, whether from expansion or contraction, staples had worked loose and out of contact with the ground wire.



Here was trouble. Inductive arcs—radio interference.



But this trouble was eliminated. Kearney Ground Wire Clips were used, with long nails driven into poles. These stay put and keep good, quiet contact between clip and ground wire. (Note illustration).



ALSO GROUND CLAMPS

And Kearney standard and Heavy Duty Ground Clamps give better, trouble-free grounds.

Ask a West Coast Kearney Representative. Maydwell & Hartzell, Inc., San Francisco, Los Angeles and Portland.

JAMES R. KEARNEY

The Mark of Quality Products

UTILITY EQUIPMENT

for BETTER Construction

TRADE MARK REG. U.S. PAT. OFF.
Nichrome
Made only by **DRIVER-HARRIS COMPANY**

Stocked for the Coast Trade at

SAN FRANCISCO
235-241 San Bruno Ave.

LOS ANGELES
449 South San Pedro St.

SEATTLE
2122 Fourth Ave.

By
ANGUS-CAMPBELL, INC.

SMOOT-HOLMAN COMPANY
Pioneers of Lighting in the West

LUMINAIRES
REFLECTORS
SIGHT-CRAFT
FLUORESCENTS
FLOODLIGHTS

INDUSTRIAL AND COMMERCIAL LIGHTING EQUIPMENT
HOME OFFICE AND FACTORY . . . INGLEWOOD, CALIFORNIA

WAREHOUSES
SAN FRANCISCO
460—7th St.
HOUSTON, TEXAS
315 Crawford Street

FRED ZAUGG
630 N.W. 10th Ave.,
Portland, Ore.
COAST SALES CO.
307 Main St.,
Seattle, Wash.

STEVENS SALES CO.
41 Post Office Place,
Salt Lake City, Utah
G. S. SPANGLER
618 Colorado Bldg.,
Denver, Colo.

LEW FLOOR BOXES
Give You Greatest Flexibility in Floor Box Applications

A floor outlet for any type of floor construction.

LEW Floor Boxes and Fittings manufactured since 1930 are credited with being the finest made.

A TRIAL WILL CONVINCE YOU
Complete stock carried in Western Warehouse
CALL or WRITE

Walter E. Brand Co.
1855 Industrial St., Los Angeles, Calif.

Lew Fittings Co.
630 W. Jackson Blvd., Chicago, Ill.

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue
We have been making safety tools for 26 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

"WHAT CAN IT DO FOR ME?"
Advertising that is read with this thought in mind may provide the solution to a problem that has kept you awake nights.
We all know "It Pays To Advertise." It pays just as big to investigate WHAT IS ADVERTISED—every month in
ELECTRICAL WEST

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.
2 East End Ave. New York

PEOPLE
made this news

P P & L PERSONNEL, POLICY CHANGES

T. E. Roach, formerly president of Washington Gas & Electric Co., Tacoma, has been named assistant to the president of Pacific Power & Light Co. to supervise and coordinate the operations of the Washington districts under the direction of the vice-president and general manager. The Washington Gas & Electric Co. electric properties, concentrated around Longview, Wash., were recently sold to the Cowlitz County PUD. In his new position, Mr. Roach

ROACH

will make his headquarters in Yakima, center of Pacific Power & Light's system in central Washington.

Coincident with this appointment, which was announced by Paul B. McKee, president, and George T. Bragg, vice-president and general manager, Sept. 1, Charles M. Sanford, secretary, was appointed assistant general manager to supervise and coordinate the operations of the Oregon districts. Sanford's headquarters will remain in Portland. Sanford has been with the company for many years.

Other personnel changes and one major policy change were announced at the same time. J. G. Hawkins, another long time employee and for some years treasurer and chief accountant of the company, will be appointed secretary and treasurer and have the secretarial functions added to his jurisdiction. H. W. Millay has been appointed assistant treasurer.

AN OPEN LETTER

To ROEBLING *Customers and Prospects*

Regarding Shipments . . .

In common with practically all manufacturers whose products are vital to Defense, Roebling is faced with a situation without precedent.

Despite our best efforts—the expansion of our working force—the installation of new machinery—and operation on a 24-hour basis—we find it impossible to keep up with the demand for Roebling electrical wires and cables.

We want you to know, however, that we keenly appreciate your problem. As a buyer, ourselves, we know how serious and irritating shipping delays can be at a time such as this.

Unfortunately, the pressure is increasing instead of decreasing. But we are alert to every opportunity to effect improvements. And you can rest assured that no stone will be left unturned by Roebling in its efforts to meet your needs.

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

San Francisco Los Angeles Seattle Portland

ROEBLING 1841 1941 100TH ANNIVERSARY

ROEBLING

ELECTRICAL WIRES AND CABLES

HELWIG Company

QUALITY CARBON BRUSHES
for
MOTORS AND GENERATORS

Catalogs on request

Stocked at:

San Francisco, Calif. — 1138 Howard St. Market 7626
Portland, Ore. — 305 N.W. 12th Ave. Broadway 0471
Los Angeles, Calif. — 225 W. Pico Blvd. PRospect 2523
Seattle, Wash. — 166 Jackson St. Elliot 3582

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

NOW—lower prices and higher capacities

There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.
Bulletins on request

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Western Representatives:
A. R. Slimmon, 445 E. 3rd St., Los Angeles
Geo. H. Curtiss, 540 McAllister St., S. F.
H. M. Sayers, 1101 Eastlake Ave., Seattle
Stevens Sales Co., 41 P.O. Place, Salt Lake City
Felix Simon, P. O. Box 614 . . . . . Denver
H. Geo. Shefler, P. O. Box 1587 . . . Phoenix

GEO. E. HONN CO.

420 Market St. San Francisco, Calif.

Manufacturers' Representative for

THOMAS INSULATORS
S & C PROTECTIVE DEVICES
CORNELL-DUBILIER CAPACITORS
KELLEMS CABLE GRIPS
BLACKBURN CONNECTORS
COLUMBIA TONG TEST AMMETERS —LOW VOLTAGE GENERATORS
BARTLETT TREE TRIMMING EQUIPMENT
METER JEWELS
BIERCE CONE ANCHORS —GUY WIRE GUARDS

CLASSIFIED SECTION

POSITION WANTED

Experienced Station Operator — steam turbine and hydro station, switchboard; 21 years operating on Pacific Coast. Best of references. At present employed. Desires change. Address Box 61, Electrical West, 68 Post St., San Francisco, Calif.

H. W. Derry, recently manager of the new industries department of the company, will continue as head of this department, but his headquarters will be transferred from Portland to Yakima.

A major policy will be to take steps to retire from the direct sale of merchandise. The sales department will continue to function under D. B. Leonard, sales manager, but will be directed toward the sale of the company's service rather than appliances. In announcing this change, the management states: "With manufacturer's output of major appliances facing sharp curtailment as the result of material shortages, it is desirable that dealers in the territory served should have access to the full number of units that will be available for sale in this area."

SANFORD

● CLYDE L. CHAMBLIN of San Francisco has been appointed on the panel of the American Arbitration Assn. A national panel of arbitrators is selected and its members made available for the arbitration of any trade disputes. Chamblin has been president of the electrical contractors organizations in San Francisco and northern California as well as of NECA and is a member of the Council on Industrial Relations for the electrical construction industry.

● A. E. ORMSBY, formerly with the Vancouver office of Canadian General Electric has now been appointed manager of the Edmonton, Alberta, office of that company. J. McAllister, present manager of the Edmonton office is being transferred to Vancouver.

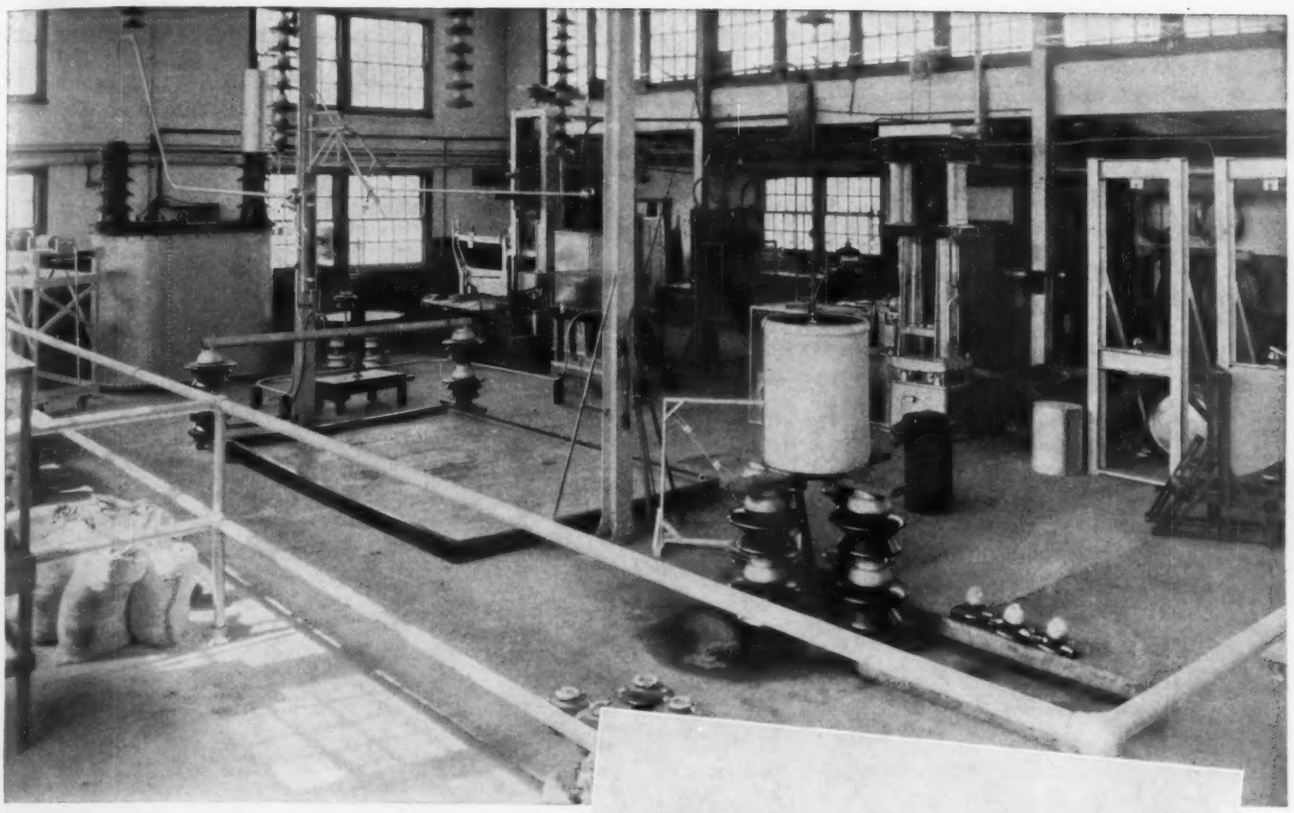
● PAUL B. MCKEE, president of Pacific Power & Light Co., Portland, has been elected to a five-year term on the board of overseers of Whitman College.

KOPPITZ, HEBERLEIN ASSUME R&IE DUTIES

C. G. Koppitz has been elected vice president and consulting engineer of Railway and Industrial Engineering Co., and G. E. Heberlein has been appointed to take over Koppitz' former duties as chief engineer. Koppitz' career with the electrical industry began in 1896 with the operation of the steam station at San Jose, Calif. This was followed by two years in the erection and operation of a pioneer 1155-ft. head hydro development near Sonora, Calif. Following several years in Europe as an erecting and operating engineer, Koppitz was employed in the East in the erection and operation of steam station equipment. He joined the Railway & Industrial Engineering Co. in 1914.

Heberlein graduated from Washington State College in 1926 with a degree in electrical engineering and entered the employ of Westinghouse Electric & Mfg. Co., serving as development engineer on carrier current relaying, supervisory controls and switching equipment design. He left the employ of Westinghouse in 1941.

● DAVID C. PRINCE, president of AIEE, and manager of the commercial engineering department of the General Electric Co., spent two days in San Francisco on a recent Western tour. Prince's first day in San Francisco, Sept. 2, was spent in conference with local engineers and industrialists and the following evening he addressed a meeting of the San Francisco section of the AIEE. Prince addressed other sections of the society in Los Angeles, Sept. 16; San Diego, Sept. 17; Portland, Sept. 18; Seattle, Sept. 19; Vancouver, Sept. 22, and Spokane, Sept. 23.



Where there's no Such thing as "*Good Enough*"

Insulators that can't quite make the grade never survive the exacting tests of our ultra-modern electro-mechanical laboratory. . . . From the raw porcelain pug to the completely assembled job, every step is checked and double checked by men who know what is expected of a Victor Insulator. . . . An expensive procedure of manufacture, perhaps, but in the long run it pays in lasting and safe performance on the line. We would be pleased to refer you to some critical but satisfied customers.

V *The Mark of a* **GOOD** *Insulator*

VICTOR INSULATORS, INC.
VICTOR, NEW YORK

SAN FRANCISCO PORTLAND — MAYDWELL & HARTZELL INCORPORATED — LOS ANGELES PHOENIX

Engineers & Manufacturers' Representatives

AUTHORIZED ELECTRICAL

IN THE ELEVEN

Dealers - Keep Handy for Reference

When returning appliances for repair, be sure to give complete information on tag attached to appliance. (1) Your Name and Address. (2) Tell what's wrong with appliance. (3) State if repairs are expected under a guarantee. (4) If repairs are not under a guarantee, state whether you authorize repairs, or whether you want an estimate on the cost of repair.

AMERICAN IRONING MACHINE CO., Algonquin, Ill.
Los Angeles: Elect. Appl. Service Corp., 726 W. Venice Blvd.

AMERICAN SAFETY RAZOR CORP., Brooklyn, N. Y.
San Francisco: Amer. Safety Razor Corp., 290 First St.

APEX ELEC'L MFG. CO., Cleveland, Ohio.
Oakland: Factory Branch, 575 8th St.
Seattle: Appliance Parts & Service Co., 214 Stewart St.
Portland: W. L. May Co., 24 N.W. Broadway.
San Francisco: Appliance Service Co., 322 Hayes St.
Oakland: Apex Appliance Service, 527 E. 8th St.
Los Angeles: Elec'l Appliance Service Corp., 726 W. Venice Blvd.
Salt Lake City: Apex Sales & Service Co., 171 E. Broadway, So.

AUTOMATIC WASHER CO., Newton, Iowa.
Los Angeles: Elect. Appl. Service Corp., 726 W. Venice Blvd.

BLACKSTONE CORP., Jamestown, N. Y.
Seattle: Appl. Parts & Service Co., 214 Stewart St.
Portland: W. L. May Co., 24 N.W. Broadway.
San Francisco: E. E. Menard, 1045 Bryant St.
Los Angeles: Elect. Appl. Service Corp., 726 W. Venice Blvd.

CHICAGO ELECTRIC MFG. CO., Chicago, Ill.
Handyhot Junior Electric Washer, Silverqueen and Handyfreeze Ice Cream Freezers, Standard and "Magic Strainer" Models of Sunkist "Juicit."
Portland: Morrison Elect. Service, 1236 S.W. Washington.
San Francisco: Byington Elec. Co., 1809 Fillmore St.
Los Angeles: Motor & Machinists Sup. Co., 236 So. San Pedro St.
Other Appliances repaired at factory.

CHICAGO FLEXIBLE SHAFT CO., Chicago, Ill.
San Francisco: W. M. Aronson, 955 Folsom St.
Los Angeles: Electric Ltg. Supply Co., 216 W. 3rd St.
Phoenix: Vinson - Carter Elec. Co., 25 E. Adams St.

CONLON CORP., Chicago, Ill.
Seattle: Appl. Parts & Service Co., 214 Stewart St.
Spokane: Spokane Washer Co., N. 20 Washington St.
Portland: W. L. May Co., 24 N.W. Broadway.
San Francisco: Angelis Sales & Service, 54 Seventh St.
Los Angeles: Elect. Appl. Service Corp., 726 W. Venice Blvd.

CROSLEY CORP., Cincinnati, O.
Seattle: North Coast Elect. Co., 171 Jackson St.
Spokane: Standard Sales Co., W. 1219 First Ave.
Portland: North Coast Elect. Co., 625 N. Everett St.
San Francisco: Calif. Elect. Co., 1585 Folsom St.
Los Angeles: Assoc. Wholesale Elect. Co., 1111 Santee St.
San Diego: San Diego Auto Elec. Co., 916 Union St.
Salt Lake City: Western Supply Co., 357 W. 2nd St. S.
Denver: Parker Co., 1520 Wazee.
Phoenix: Momsen - Dunnegan & Ryan Co.

DOMINION ELECTRICAL MFG., INC., Mansfield, Ohio.
Seattle: Hopper Electric Co., 212 Seneca St.
Portland: Morrison Electric Co., 13th and Washington Sts.
San Francisco: Radelfinger Bros., 544 Natoma St.
Los Angeles: Electric Lt. & Supply Co., 216 W. 3rd St.

EASY WASHING MACHINE CORP., Syracuse, N. Y.
Seattle: Sunset Electric Co., 300 Westlake North.
Spokane: Tull & Gibbs, Inc., 1st Ave. and Wall St.
Portland: Sunset Electric Co., N.W. 10th and Glisan.
Sacramento: Jas. S. Remick Co., 909 Twelfth St.
San Francisco: Angelis Sales & Service, 54 Seventh St.
Berkeley: Home Appl. Service Co., 2318 Shattuck Ave.
Los Angeles: Elect. Appl. Service Corp., 726 W. Venice Blvd.
Phoenix: Graybar Electric Co., 434 W. Madison St.
Salt Lake City: Z.C.M.I., Wholesale Appl. Div., 351 Z.C.M.I. Ave.
Great Falls: Barber Music Standard Furn., Inc., 520 Central.

EDISON GENERAL ELECTRIC APPLIANCE CO., Chicago, Ill.
Seattle: Graybar Elec. Co., King and Occidental Sts.
Spokane: Graybar Elec. Co., 152 So. Post St.
Tacoma: Graybar Elec. Co., 1214 A St.
Portland: Graybar Elec. Co., Park & Flanders Sts.; Stubbs Electric Co., 33 N.W. Park Ave.
San Francisco: Graybar Elec. Co., 9th and Howard Sts.
Fresno: General Elec. Supply Corp., 1117 N St.
Los Angeles: General Elec. Supply Corp., 700 Turner St.
Salt Lake City: Graybar Elec. Co., 245 So. 1st West.
Denver: General Elec. Supply Corp., 1429 18th St.
Butte: Graybar Elec. Co., East Front and Harrison Sts.

EUREKA VACUUM CLEANER CO., Detroit, Mich.
Serviced by company branches.
Portland: 510 S.W. Salmon St.
Salt Lake City: 177 E. Broadway.
Denver: 2903 W. 32nd St.
San Francisco: 745 Mission St.
Los Angeles: 2515 W. 7th St.

FITZGERALD MFG. CO., Torrington, Conn.
Service on all appliances.
Los Angeles: Factory Branch, 1147 So. Hope St.
Mixers, Hot Plates, Irons, only.
Seattle: Howell's Electric, 522 Union St.
Portland: Morrison Electric, 13th and Washington Sts.
San Francisco: W. W. Aronson, 955 Folsom St.

FLOOROLA PRODUCTS, INC., York, Pa.
Minor repairs.
Los Angeles: Floorola Products of California.
Major repairs.
Send to factory.

GENERAL ELECTRIC APPLIANCE SERVICE.
Rocky Mountain Area serviced by Gen. Elec. Supply Corp.
Salt Lake City: 310 W. 2nd So.
Denver: 1429 18th St.
Boise: 1210 Grove St.
Butte: 900 E. Front St.
Billings: 2710 Montana Ave.
Pacific Coast Area — by Appliances.

Radios—Vacuum Cleaners
Serviced by G. E. Supply Corp.
Seattle: 1212 First Ave. So.
Radios—Nick H. Foster, 2301 Fifth Ave.
Spokane: S. 122 Monroe St.
Portland: 230 N.W. Broadway.
Sacramento: 1131 S St.
San Francisco: 1201 Bryant.
Oakland: 204 Ninth St.
Fresno: 1117 N St.
Los Angeles: 700 Turner St.
San Diego: 205 W. Market St.
Phoenix: 441 W. Madison St.

Fans
Serviced by G. E. Supply Corp. in cities listed for "Radios-Vacuum Cleaners." Also serviced by Graybar Electric Co. in Sacramento, San Francisco, Oakland, Fresno, Los Angeles, San Diego, Phoenix. In addition serviced in Tacoma: Home Elec. Co., 1316 A St.
Salem, Ore.: Eoff Elec. Co.

Home Laundry, Household Refrigerators, Ranges, Water Heaters, Dishwashers, Disposalls.
Seattle: G. E. Supply, 1212 First Ave. So.; Refrigerators—Acme Refrig. Co., 2214 Fourth Ave.
Spokane: G. E. Supply, S. 122 Monroe St.
Portland: G. E. Supply, 230 N.W. Broadway; Refrigerators—J. C. Stump Refrig. Co., 612 N.W. Davis St.
Sacramento: G. E. Supply, 1131 S St.
San Francisco: G. E. Supply, 1201 Bryant St.
Oakland: G. E. Supply, 204 Ninth St.
Fresno: Valley Elec. Supply, Power Bldg.
Los Angeles: Geo. Belsey Co., 1001 So. Hope St.
San Diego: Geo. Belsey Co., 1134 First Ave.
Phoenix: Geo. Belsey Co., 547 W. Jefferson.

Heating Devices—Sunlamps.
Seattle: Factory Service Sta., 2032 2nd Ave.
Portland: Barnet Elec. Co., 324 N.W. Broadway.
San Francisco: Gen. Electric Co., 133 Eighth St.
Ontario: Gen. Electric Co.

Clocks
Seattle: Ray D. Reid, 1417 4th Ave. Bldg.
Spokane: Maxwell & Franks, First and Wall Sts.
Portland: B. W. Cobb Watch & Clock Shop, 220 S.W. Alder.
Sacramento: A. E. Cunningham, 2619 N St.
San Francisco: Calif. Elect. Service Sta., 639 Mission.
Los Angeles: Calif. Elect. Serv. Sta., 630 W. 9th St.
San Diego: J. F. Zwiener Elec. Co., 229 B St.
Phoenix: Vinson-Carter Elec. Co., 25 East Adams St.

GENERAL SHAVER DIVISION of Remington Rand, Inc.
Serviced by Remington Rand offices at—
Seattle: 1910 Fourth Ave.
Spokane: W. 916 Riverside Ave.
Portland: 525 S.W. Pine St.
Sacramento: 1107 J St.
Stockton: 424 E. Weber Ave.
San Francisco: 41 First St.
Oakland: 2032 Broadway.
San Jose: 20 E. San Antonio.
Fresno: 1916 Fresno St.
Bakersfield: 1822 G St.
Santa Barbara: 15 A.E. Figueroa.
Los Angeles: 905 S. Hill St.
San Diego: Bank of America Bldg.
Phoenix: 128 S. Central Ave.
Tucson: 20 E. Broadway.
Denver: 1525 Arapahoe St.
Salt Lake City: 47 W.S. Temple.
Boise: 157 S. Eighth St.
Butte: 120 W. Broadway.
Albuquerque: 21 W. Copper Ave.

GIBSON ELEC. REFRIGERATION CORP., Greenville, Mich.
Seattle: Seattle Hdwe. Co., 501 1st Ave., So.
Spokane: Spokane Paper & Stationery Co., So. 152 Jefferson
Portland: Elec'l Distributors, Inc., 525 N.W. 10th St.
Klamath Falls: East Side Appliances.
San Francisco: H. R. Basford Co., 425 Second St.
Sacramento: Jas. S. Remick Co., 909 12th St.; Tom Dunn, Assoc. Refrigeration Co., 1717 Broadway.
Los Angeles: Graybar Elec. Co., Inc., 201 Santa Fe Ave.
San Diego: Eaton's Appliance Service, 1262 Union St.
Phoenix: Graybar Elec. Co., Inc., 34 W. Madison St.
Denver: Austin Appliance Co., 414 15th St.
Salt Lake City: Refrigeration Service Eng'g, 62 4th St.; United Elec. Supply Co., 117 W. 4th St.
Brigham City: Sam Richards.
Nampa, Idaho: McLain Hdwe. Co., 1302 1st St.
Billings: Billings Hdwe. Co.

THE A. C. GILBERT CO., New Haven, Conn.
Electrical Appliances and Fans only—
Seattle: Elec'l Engineering Co., 110 Marion St.
Portland: Morrison Electric Service, 1236 S.W. Washington.
San Francisco: Will M. Aronson, 955 Folsom St.
Los Angeles: Motor & Machinists Elec. Sup. Co., 230 So. San Pedro St.
American Flyer trains only—
Seattle: Elec'l Engineering Co., 110 Marion St.
Portland: Barnet Electric Co., 324 N.W. Broadway.
San Francisco: A. C. Gilbert Co., Atten: A. R. Auger, 718 Mission St.
Los Angeles: Motor & Machinists Elec. Sup. Co., 230 So. San Pedro St.; J. R. Metz, 1753 W. 21st St.

HANKSCRAFT COMPANY, Madison, Wis.
San Francisco: Erlach-Lee Co., 718 Mission St.

THE HOBAR CO., New York City.
All Twinface Clock repairs at factory.

HORTON MFG. CO., Fort Wayne, Ind.
Seattle: Sunset Electric Co., 300 Westlake, No.
Portland: N.W. 10th and Glisan.
San Francisco: Automotive Service Co., 930 Van Ness Ave.; Victory Supply Corp., 2813 Mission St.
Los Angeles: Elec'l Appliance Service Corp., 726 W. Venice
Phoenix: Motor Supply Co.

APPLIANCE SERVICE STATIONS

WESTERN STATES

***Compiled by* ELECTRICAL WEST**

68 Post St., San Francisco, Califonia

This Dealer-Aid enables Electrical West to more adequately fulfill its purpose—service to the entire electrical industry throughout the West. This listing is offered to appliance manufacturers free of charge. All manufacturers who responded to the request for information have been included. Additions or revisions should be sent to Electrical West.

Denver: Spitzer Elec'l Co.
Salt Lake City: Salt Lake City Elec. Co.
Amarillo: E. S. Cowie Elec. Co.

INTERNATIONAL APPLIANCE CORP., Brooklyn, N. Y.
San Francisco: W. M. Aronson Co., 955 Folsom St.

IRONRITE IRONER CO., Detroit, Mich.
Seattle: Harper-Meggee, Inc., 960 Republican St.
Spokane: Harper-Meggee, Inc.
Portland: Harper - Meggee Inc., 17th and Irving.
Oakland: Gordon E. Wilkins, Ironers, Inc., 3100 Telegraph Ave.
Los Angeles: Elec'l Appliance Service Corp., 726 W. Venice
Denver: Gordon E. Wilkins, Inc., 1925 Blake St.
Salt Lake City: Gordon E. Wilkins, Inc., 144 So. 5th St.

KITCHENAID DIVISION, The Hobart Mfg. Co., Troy, Ohio.
Seattle: C. L. Dick, 2208 Second Ave.
Portland: J. W. McCrea, 239 N.W. 14th Ave.
San Francisco: J. W. Jacobi, 929 Mission St.
Los Angeles: H. M. Benner, 410 So. Los Angeles St.
Salt Lake City: Geo. A. Pruatt, 24 S.W. Temple St.

THE KNAPP MONARCH CO., St. Louis, Mo.
Seattle: Howell's Elec. Supply Co, 522 Union St.
Spokane: Brown-Johnston Co., N. 118 Lincoln St.
Portland: Morrison Elec. Co., 13th and Washington Sts.
San Francisco: W. M. Aronson, 955 Folsom St.
Los Angeles: The Elec'l Appliance Service Corp., 726 W. Venice Blvd.
Salt Lake City: Walters Elec. Co., 238 So. State St.

LANDERS, FRARY & CLARK, New Britain, Conn.
Seattle: Howell's Elec. Supply & Service Co., 522 Union St.
Spokane: Brown-Johnston Co., No. 118 Lincoln St.
Yakima: Yakima Hdwe. Co.
Portland: Morrison Elec. Service, 1234 S.W. Washington.
San Francisco: Universal Elec. Appliance Co., 1265 Folsom St.
Los Angeles: Utility Repair Shop, 1928 West 7th St.
Phoenix: Vinson-Carter Elec. Co., 25 E. Adams St.
Denver: Nollenberger Elec. Co., 1408 Stout St.
Dallas: Egon's Electric Shop, 311 No. Akard St.
El Paso: Hays Elec. Motor Service, 403 Montana St.

A. J. LINDEMANN & HOVERSON CO., Milwaukee, Wis.
Seattle: Appliance Wholesalers of Seattle, 429 Boren Ave., No.
Spokane: The Crescent Co.
Portland: Appliance Wholesalers of Oregon, 123 N.E. 3rd St.
Salt Lake City: Z.C.M.I.
Boise: Z.C.M.I.
Kalispell: Kalispell Mercantile Co.

MAGIC-AIRE, INC., Cleveland, Ohio.
Seattle: The Seattle Hdwe. Co., 501 1st Ave., So.
Spokane: Jensen-Byrd Co., 314 Riverside Ave.
Portland: The Stubbs Co., 33 N.W. Park Ave.
San Francisco: H. R. Basford Co., 425 2nd St.
Los Angeles: Associated Wholesale Elec. Co., 1111 Santee St.
Denver: Good Housekeeping Stores, 1610 Broadway.
Pocatello: Billmeyers.

MANNING, BOWMAN & CO., Meriden, Conn.
Seattle: Howell's Elec. & Supply Co., 522 Union St.
Spokane: Maxwell & Frank, First at Wall St.
Portland: Morrison Elec. Sup. Co., 1236 S. Washington St.
San Francisco: Manning, Bowman & Co., 150 Post St.
Los Angeles: Motor & Machinists Sup. Co., 230 So. San Pedro St.
San Diego: J. F. Zwiener Elec. Co., 229 "B" St.
Phoenix: Vinson Carter Elec. Co., 25 E. Adams St.
Denver: Hendrie & Bolthoff Mfg. & Sup. Co., 1635 17th St.
Salt Lake City: Time & Instrument Co., 222 Dooly Bldg.
Dallas: Emerson Elec. Co., 2000 Live Oak St.

NATIONAL ENAMELING & STAMPING CO., Milwaukee, Wis.
Seattle: City Elec. & Fixture Co., 1022 3rd Ave.
Spokane: Maxwell & Franks.
Portland: Bressie Elec. Co., 909 S.W. 5th St.
San Francisco: Will M. Aronson Co., 955 Folsom St.
Los Angeles: State Appliance Co., 451 E. 4th St.
Denver: Midwest Elec. Wiring Co., 323 West Colfax.
Salt Lake City: Time & Instrument Co., 222 Dooly Bldg.
Dallas: Douglass Elec. Appliance Co., 1323 W. Davis.

NAXON UTILITIES CORP., Chicago, Ill.
Portland: W. L. May Co., 24 N.W. Broadway.
Los Angeles: Elec'l Appliance Service Corp., 726 W. Venice

NINETEEN HUNDRED CORPORATION, St. Joseph, Mich.
Los Angeles: Elec'l Appliance Service Corp., 726 W. Venice

PREMIER DIVISION, ELEC. VACUUM CLEANER CO., INC., Cleveland, Ohio.
San Francisco: Premier Div., Elec. Vacuum Cleaner Co., 214 Chronicle Bldg.
Los Angeles: Premier Div., Elec. Vacuum Cleaner Co., 953 Bendix Bldg.
Inter-Mountain States serviced from Omaha and Minneapolis branches.

PROCTOR ELECTRIC CO., Philadelphia, Pa.
Seattle: City Elec. & Fixture Co., 1022 3rd Ave.
Tacoma: Ajax Elec. Co., 740 Broadway.
Portland: Bressie Electric Co., 309 S.W. 5th Ave.
San Francisco: California Elec'l Construction Co., 639 Mission
Los Angeles: Elec'l Appliance Service Corp., 726 W. Venice
San Diego: J. F. Zweiner Elecl Co., 229 13th St.
Salt Lake City: Time & Instrument Co., 222 Dooly Bldg.

THE SCOTT & FETZER CO., Cleveland, Ohio.
Seattle: Kirby Co. of Seattle, 125 1st Ave., No.
Spokane: Kirby Co. of Spokane, 1314 W. Broadway.
Tacoma: Ray A. Page, 608 No. Puget Sound Ave.
Portland: Kirby Co., 5930 N.E. Union Ave.
Oakland: Dewey C. McCauley, 1924 Broadway.
Los Angeles: Kirby Co. of So. Calif., 415 Holm Bldg.
Salt Lake City: Thomas E. Towler, 1628 So. 3rd East.
Boise: Kirby Co. of Idaho, 2402 No. 21st St.
Great Falls: Kirby Co. of Mont., 13 5th St., So.
Billings: Kirby Co. of So. Montana, Box 685.

SETH THOMAS CLOCKS, Thomaston, Conn.
San Francisco: Schloss Mfg. Co., 540 Mission St.

SHEPLER MFG. COMPANY, Pittsburgh, Pa.
Los Angeles: Electric Lighting Supply Co., 216 W. 3rd St.

THE SILEX COMPANY, Hartford, Conn.
Seattle: Elec'l Engineering Co., 110 Marion St.
Spokane: Maxwell & Franks, 619 1st Ave.
Portland: Morrison Elec. Co., S.W. Washington at 13th.

SON-CHIEF ELECTRICS, INC., Winsted, Conn.
Seattle: Howell's Elec. & Supply Co., 522 Union St.
Portland: Morrison Elec. Co., Washington at 13th.
San Francisco: Will M. Aronson, 955 Folsom St.
Los Angeles: State Appliance Co., 451 E. 4th St.
Denver: Queen City Elec. Co., 1158 California St.
Dallas: Egons Elec. Shop, 311 N. Akard St.

STEAM-O-MATIC CORP., Milwaukee, Wis.
Seattle: City Elec. & Fixture Co., 1022 3rd Ave.
Portland: Morrison Elec. Service, 1236 S.W. Washington.
San Francisco: California Elec'l Construction Co., 639 Mission
Los Angeles: Motor & Machinists Supply Co., 230 So. San Pedro
San Diego: J. F. Zweiner Elec'l Co., 229 "B" St.
Denver: Midwest Elec. Wiring Co., 323 W. Colfax.
Salt Lake City: Time & Instrument Co., 222 Dooly Bldg.

THE SWARTZBAUGH MFG. CO., Toledo, Ohio.
Seattle: City Elec. & Fixture Co., 1022 3rd Ave.
Portland: Morrison Elec. Co., S.W. Washington at 13th.
San Francisco: California Elec. Construction Co., 639 Mission
Los Angeles: Motor & Machinists Sup. Co., 230 S. San Pedro.

THE TOASTSWELL CO., St. Louis, Mo.
Portland: Morrison Elec. Co., 1236 So. Washington.
San Francisco: California Elec. Construction Co., 639 Mission St.; The Marine Elec. Co., 195 Fremont St.
Los Angeles: Anderson's Repair Service, 616 Maple Ave.

THE TORK CLOCK COMPANY, INC., Mt. Vernon, N. Y.
Seattle: H. M. Sayers, 1101 Eastlake Ave.
San Francisco: Geo. H. Curtiss, 540 McAllister St.
Los Angeles: A. R. Slimmon & Co., 443 E. 3rd St.
Salt Lake City: Stevens Sales Co., 41 Post Office Place.

VIDRIO PRODUCTS CORP., Chicago, Ill.
Los Angeles: State Appliance Service, 451 E. 4th St.

VOSS BROTHERS MFG. CO., Davenport, Iowa.
Seattle: Appliance Parts & Service Co., 214 Stewart St.
Portland: W. T. Dyke Service Co., 122 S.W. 5th Ave.
San Francisco: California Refrig. Co., 1077 Mission St.
Los Angeles: Elec. Appliance Parts Serv. Corp., 726 W. Venice Blvd.

WAAGE MFG. CO., Chicago, Ill. For Irons and Percolators—
Seattle: Elec'l Engineering Co., 110 Marion St.
Portland: Morrison Elec. Co., S.W. Washington at 13th.
Los Angeles: Electric Ltg. Supply, 216 W. 3rd St.

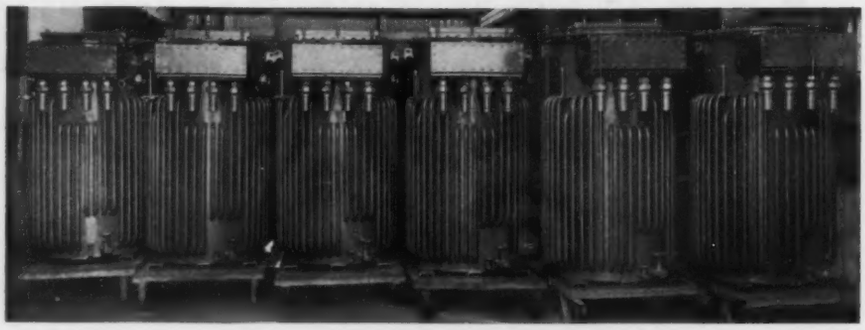
THE WARING CORPORATION, New York City.
Seattle: City Elec. & Fixture Co., 1022 3rd Ave.
San Francisco: California Elec'l Service Sta., 639 Mission St.; Will M. Aronson, 955 Folsom St.
Sacramento: McKesson & Robbins, Inc., 919 Front St.
Los Angeles: Motor & Machinists Supply Co., 230 So. San Pedro St.

WARREN TELECHRON CO., Ashland, Mass.
Seattle: City Elec. & Fixture Co., 1022 3rd Ave.
Spokane: Maxwell & Franks, 619 1st Ave.
Portland: B. W. Cobb Watch & Clock Shop, 226 Alder St.
San Francisco: California Elec. Service Sta., 639 Mission St.
Los Angeles: California Elec. Service Sta., 630 W. 9th St.
San Diego: J. F. Zweiner Elec. Co., 229 "B" St.
Denver: Radio Service Corp., 30 W. 13th St.
Salt Lake City: Time & Instrument Co., 222 Dooly Bldg.
Phoenix: Vinson - Carter Elec. Co., 25 E. Adams St.

WELLS MFG. CO., San Francisco, Calif.
Seattle: Appliance Parts & Service Co., 412 Stewart St.
Portland: Bressie Elec. Co., 909 S.W. 5th St.
Los Angeles: Restaurant Equip-Service, 1152 So. Olive St.
San Diego: J. F. Zweiner Co., 229 "B" St.

WESTINGHOUSE ELEC. & MFG. CO.
Serviced by Westinghouse Electric Supply Co.
Seattle: 1051 First Ave.
Spokane: 152 So. Monroe St.
Tacoma: 1115 "A" St.
Portland: 134 N.W. 8th Ave.
San Francisco: 260 5th St.
Oakland: 10th and Alice Sts.
Sacramento: 20th and "R" Sts.
Los Angeles: 905 E. 2nd St.
Salt Lake City: 235 W. So. Temple St.
Phoenix: 315 W. Jackson St.
Butte: 50 E. Broadway.
San Diego: Elec. Supplies Distr. Co., 435 2nd Ave.
Reno: H. E. Saviers & Son, Inc., 2nd and West Sts.

EDWIN L. WIEGAND CO., Pittsburgh, Pa.
Serviced by Montgomery Bros.—
Seattle: 911 Western Ave.
Portland: 2333 N.W. Westover St.
San Francisco: 61 Fremont St.
Los Angeles, 420 So. San Pedro St.



"Wings For America"

WITH THE AID OF
GARDNER Transformers

Trouble-free, dependable operation is assured when you install performance-tested GARDNER Transformers. The superior operating characteristics offered by these sturdily built transformers—engineered to meet the most exacting specifications—has been recognized by the aviation industry. One of the large Southern California aircraft factories recently received shipment of 3—200 KVA and 3—333 KVA Gardner transformers, 2500/2375/2250 volts to 480 volts (similar to units illustrated above).

Let us help YOU solve your voltage problems. Write for full information.

Gardner Electric Mfg. Co.
4227 Hollis St. Emeryville, Calif.

Represented by

MAYDWELL & HARTZELL
INCORPORATED
SAN FRANCISCO - LOS ANGELES - PHOENIX - PORTLAND

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Electrical West, published monthly at San Francisco, Calif., October 1, 1941.

State of California, } ss.
County of San Francisco }

Before me, a notary in and for the state and county aforesaid, personally appeared George C. Tenney, who having been duly sworn according to law, deposes and says that he is the Editor of Electrical West, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc. ,of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:

Publisher, McGraw-Hill Company of California.....68 Post St., San Francisco, Calif.
Editor, George C. Tenney.....68 Post St., San Francisco, Calif.
Managing Editor .....None
Business Manager.....Roy N. Phelan, 68 Post St., San Francisco, Calif.

2. That the owners are: Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.

McGraw-Hill Company of California, San Francisco, Calif.; McGraw-Hill Publishing Company, Inc., New York City; James H. McGraw, New York City; Howard Ehrlich, New York City; R. A. Balzari, San Francisco, Calif.; N. A. Bowers, San Francisco, Calif.; George C. Tenney, San Francisco, Calif.; John W. Otterson, San Francisco, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amounts of bonds, mortgages, or other securities are: None.

GEORGE C. TENNEY, Editor

Sworn to and subscribed before me this 16th day of September, 1941.

(SEAL) W. E. SCHORD, ,
(My commission expires March 22, 1942)

AN ESSENTIAL DEALER REFERENCE

"OFFICIAL APPLIANCE SERVICE STATIONS"—outstanding dealer service feature of this issue of ELECTRICAL WEST is available in reprint form. With appliance servicing becoming a major part of every dealer's business, this accurate, authorized-by-manufacturer data on "who and where to get it correctly repaired" is an essential reference for every dealer. Write for reprint prices.

EDWARD MARTIN, ELECTRICAL INDUSTRY LEADER PASSES

Edward Martin, one of the "wheelhorses" of the electrical contractors' associations in Northern California, finally resigned. His generous heart which since 1924 had concerned itself with the difficulties of his fellow contractors, stoped, Sept. 10, at his San Francisco home, following a couple of years of ill health. He had tried in vain to resign as secretary of the San Francisco Electrical Contractors Assn. Yet, though he was required to carry none of its duties, the association refused to accept his retirement from a job he had held with only minor interruptions since 1932.

Ed Martin began in the harness as president in 1924-5, was a member of the executive committee 1926-30, secretary pretty much from then on. California Electragists elected him secretary too in 1925-6, president for 1929-31 and he remained as secretary of its successor, the Northern California Electrical Contractors Assn. from 1932 to 1937. The San Francisco Electrical Development League elected him prseident in 1933. He had started in business for himself, proprietor of Sterling Electric Co. right after the 1906 fire.

● WALTER D. MCDONALD, connected with the Westinghouse Electric & Manufacturing Co. since 1900 until his retirement several years ago, died in Seattle on August 22, after an illness of many months. "Mac", as he was affectionately known throughout the electrical industry, was Seattle manager of Westinghouse at the time of his retirement. He joined Westinghouse sales force in Chicago in 1900, after a term as chief electrical engineer for the Baltimore & Ohio Railroad in Wisc.

TRADE notes

● SLAUSON'S RADIO SERVICE entered a new building at 1760 Harrison Ave., Butte, Mont., last month. Established 9 years ago by Winfred E. Slauson, the company outgrew its former building and built a new one of its own. A fluorescent lighting system has been installed. Opening ad featured General Electric ranges and refrigerators, ironers, and electric sinks. Roses were given to the first 200 ladies visiting the store. Parking space with drive-in facilities for bringing in repair work was likewise advertised.

● MYRON SWENDSEN has been appointed sales representative for Pacific Electric Mfg. Co., in the territory served from Boise, Idaho. He is an electrical engineering graduate and has had considerable experience in utility work, having been a power-house operator, civil engineer for a utility, and for the last eight years engaged in engineering and sales work, according to Henry Brooke, Pacific Electric sales manager who made the appointment.

● S. F. RICKETTS ELECTRIC LTD. is changing its name to Ricketts-Sewell Electric Ltd. The firm is operating at 342 West Pender Street, Vancouver, B. C. S. Ricketts, head of the firm, has had a long term in the electrical industry in Great Britain, the Orient and Vancouver and is a former secretary of the Vancouver Electrical Association.

● UTILITY ELECTRIC CO., manufacturers of Toastwell toasters and other heating appliances, have changed the company name to the Toastwell Co. According to the company, this change was made to tie the product name and company more closely together.

MOVED

New Mission Electric Co., has moved from 4175 24th St., San Francisco to 655 26th St.

Mullenbach Electrical Mfg. Co. has moved to 2300 East 27 St., Los Angeles, Calif. They are representatives for Clark Controller Co. and Bull Dog Electric Products.

The James H. Blinn Co. have moved to 200 Sugar Bldg., Denver, Colo.

Economy Appliance Co., Kelvinator dealers, from 131 East 2nd South to 123 East Broadway, Salt Lake City. W. Layton Barlow is manager.

New appliance dealer in Salt Lake City is the Easton Sporting Goods and Appliance company at 225 South State Street. A. A. Eason is manager.

The Switch to Bigger Sales!

Range figures for '41 indicate that the switch is to switches. And UNIVERSAL dealers everywhere agree that the switch to bigger sales is the Mult-I-Heat Control. Only UNIVERSAL offers this and all the other features that insure the dependable accuracy of "Precision Cooking."

National Promotion Tied in with the Modern Kitchen Bureau

5 STAR FEATURES

1. MULT-I-HEAT CONTROLS WITH SIGNALITE INDICATORS
2. MAGIC EYE OVEN CONTROLS
3. SELECT-A-TROL
4. SUPERHEAT UNITS
5. SERV-A-DRAWER

THE TRADE MARK KNOWN IN EVERY HOME

UNIVERSAL

LANDERS, FRARY & CLARK ☆ New Britain, Conn.

INDEX TO ADVERTISERS
October, 1941

Allis-Chalmers Mfg. Co. 4, 5
Aluminum Company of America 3
American Steel & Wire Co. 26
Anaconda Wire & Cable Co. 23
Brewer-Titchener Corp., The 79
Briegel Method Tool Co. 16
Bull Dog Elec. Products Co. 20
Burndy Engineering Co., Inc. 10
California Oregon Power Co. 49, 50
Chance Co., A. B. 78
Chicago Flexible Shaft Co. 86
Classified Section 94
Columbia Steel Co. 26
Couch & Co., S. H. 82
Crescent Ins. Wire & Cable Co. 12
Crocker First National Bank 10
Driver-Harris Co. 92
Electrical Testing Labs. 92
Everstick Anchor Co. 82
Fast & Co., John E. 15
Gardner Elec. Mfg. Co. 98
G.C.A. Mfg. Co 92
General Electric Co.
Bridgeport 24
Schenectady 1, 84, 85
Helwig Company 94
Honn Co., Geo. E. 94
Hotpoint (Edison G-E Appliance Co., Inc.) Water Heater 29
Hubbard & Co. 32
Idaho Power Company 49, 50
Ideal Commutator Dresser Co. 86
Illinois Elec. Porcelain Co. 81
Indiana Steel & Wire Co. 14
Jeffries Transformer Co. 14
Johns-Manville Corp. 77
Kearney Corp., James R. 91
Klein & Sons, Mathias 10
Landers, Frary & Clark 99
Lapp Insulator Co., Inc. 31
Lew Fittings Co. 92
Line Material Company 19
Lloyd Products Co. 83
Matthews Corp., W. N. 87
McGraw-Hill Book Co., Inc. 14
Montana Power Company 49, 50
National Elec. Products Corp. 6
Ohio Brass Co. 7
Okonite Company, The 9
Okonite-Callender Cable Co., The 9
Pacific Coast Elec'l Bureau ..... 4th Cover
Pacific Elec. Mfg. Corp. 21
Pacific Gas and Electric Co. ..... 3rd Cover
Pelton Water Wheel Co. 80
Penn-Union Elec. Corp. 18
Portland General Elec. Co. 49, 50
Publisher's Statement 98
Puget Sound Power & Light Co. 49, 50
Reliable Electric Co. 76
Rocky Mountain Elec'l League 49, 50
Roebling's Sons Co., John A. 93
Sangamo Electric Company 88, 89
Schweitzer & Conrad, Inc. 13
Shell Oil Company 27
Smoot-Holman Co. 92
Southern California Edison Co. Ltd. ..... 2nd Cover
Square D Company 11
Thermador Elec'l Mfg. Co. 82
Thomas & Sons Co., R. 75
Tork Clock Co., Inc. 94
Trumbull Elec. Mfg. Co. 22
United States Steel Corp. 26
Utah Power & Light Co. 49, 50
Victor Insulators, Inc. 95
Wagner Elec. Corp. 25
Ward Leonard Elec. Co. 16
Westinghouse Elec. & Mfg. Co. 17
Weston Elec'l Instrument Corp. 28
Wiremold Company, The 8

PROFILES *of the month*

Like the Siamese twins at inspector conventions the two rival company representatives, (at left) L. F. Adams, General Electric Co., Schenectady, and Frank Thornton jr., Westinghouse, East Pittsburgh, were seen thus at the barbecue of the Southwestern Section, IAEI, at San Jose. Both are experts on the National Electrical Code and Electrical Committee members

Lighting men at the Rocky Mountain Electric League convention gathered to witness the presentation of a charter to the new Rocky Mountain Chapter of IES by James Ketch, Nela Park, Cleveland General Electric Lamp Dept. member of IES council. At right is D. S. Jenks, Denver G-E Lamp man, with his guest-star, Jim Ketch of Nela

Shown in the picture at the left are W. E. Lee, Westinghouse engineer at Butte, Montana, and William Stussy, Supt. of Power, Montana Power Co. (right), examining a tiny strip of magnet steel which aids in recording lightning strokes on the 585-ft. smelter stack of Anaconda Copper plant, as measured by the Westinghouse fulcronograph

Hard working convention committee of REML included these, caught for a photograph: standing, J. W. Alexander, Rawlins, new president; Bernedene Tarr, REML office; Harry Adler, entertainment; Ruth Kraft, women's group; H. T. Rankin, lighting; G. W. Milliken, Pueblo; Charlie Russell, art; G. B. Buck, president; front row: Gil Buckman, movies; George Lewis, REML manager; A. Kanekeberg, prizes; T. M. Foulk, convention chairman; and J. T. Lang square dances

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

and the Electric Appliance Society

COMMANDS MORE SERVANTS THAN ALADDIN'S LAMP

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

OCTOBER

In P.G. & E. Exclusive-Electric Territory Only:

TWO LIGHTING ADS—designed as a follow-through on our September Lamp and Light Conditioning Campaign, and carrying the same headline, i.e., "Family-style Lighting —Lamps For Every Member of the Family—For Every Purpose". One of these two ads will also appear in the metropolitan papers and throughout P.G. and E. gas-and-electric territory.

P. S. The response last month to our Lamp Campaign by dealers in the San Francisco area was extremely gratifying. We were pleased with the number and size of the newspaper tie-ins and particularly with the window displays.

EW 110-1041

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

WHEN THE SHOOTING'S OVER...

WHERE WILL YOUR BUSINESS BE?

That depends on you .... NOW.

Right now things are humming. We're in the middle of a rousing seller's market that takes all the level headedness any of us can muster. Our salesmen are virtually "refugees" from the outraged buyers who demand stuff we can't deliver. We're dizzy with the daily changes and reversals of established policies.

You and your business are on your way .... to where?

To the future you choose now .... a future of steadily better business, or a future loaded with the grief and expense of trying to reestablish your place in the picture.

It takes no crystal gazer to see that you can be dispossessed of the place you have made for yourself, if you do not keep on telling the story—the story you have spent money, time, thought, effort to build up.

And you can assure a continuing business when normal life is resumed. You can sell more wiring, more appliances, more fixtures, more service, faster and at less cost by keeping the ball rolling NOW.

Keep your customers, and your potential customers aware of you and the electrical service you render. Advertise and publicize electrical appliances, wiring, service.

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET, LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO

CERTIFIED ADEQUATE WIRING